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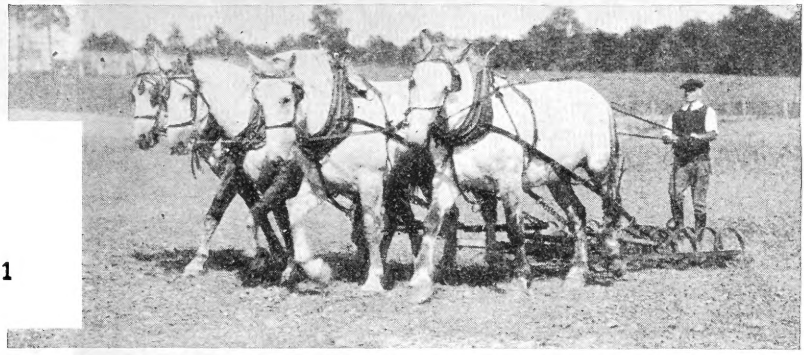
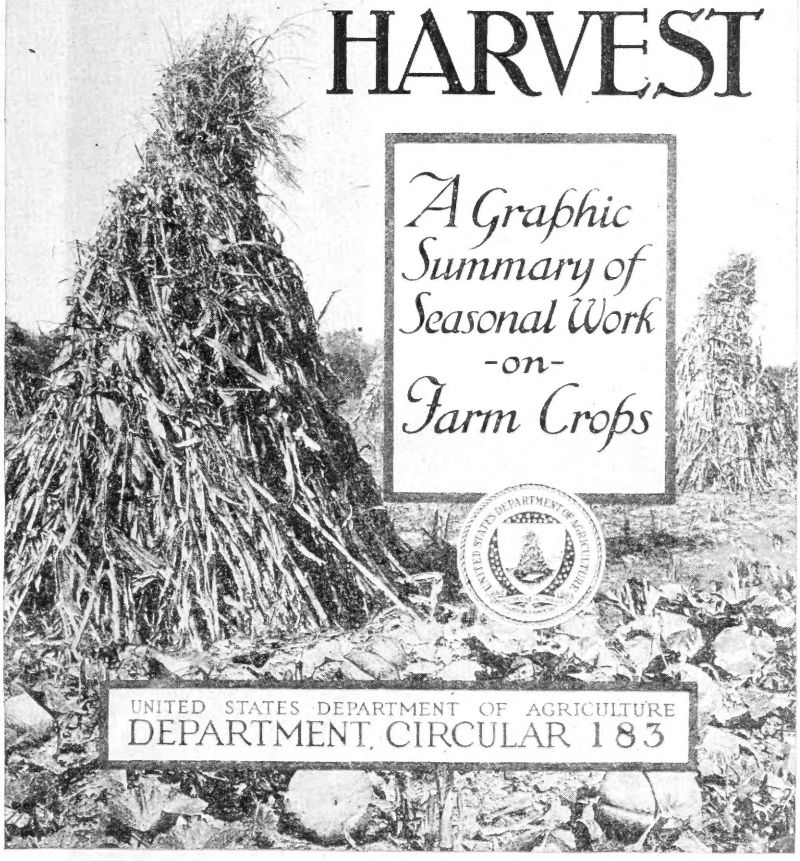


SEEDTIME and HARVEST

A Graphic Summary of Seasonal Work -on- Farm Crops



UNITED STATES DEPARTMENT OF AGRICULTURE
DEPARTMENT CIRCULAR 183

THIS CIRCULAR contains maps showing the dates when planting, harvesting, and other operations are performed in the culture of staple crops in different parts of the United States, and also graphs showing the seasonal distribution of labor by 10-day periods on typical farms in several important agricultural regions. The inscriptions under the maps and graphs afford information as to the hours of labor per acre required in growing the staple crops in certain sections of the country.

Contribution from the Office of Farm Management and Farm Economics

G. W. FORSTER, Acting Chief

Washington, D. C. Issued March, 1922

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SEEDTIME AND HARVEST.

A GRAPHIC STUDY OF SEASONAL WORK ON FARM CROPS.

By OLIVER E. BAKER, *Agricultural Economist, Office of Farm Management and Farm Economics;* CHARLES F. BROOKS, *Formerly Assistant in Farm Management;* JAMES R. COVERT, *Formerly of the Bureau of Crop Estimates;* and REGINALD G. HAINSWORTH, *Head Draftsman, Office of Farm Management and Farm Economics.*

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FARM LABOR DISTRIBUTION.

THE PROBLEM OF LABOR DISTRIBUTION on a farm is very different from that of a manufacturing plant. In a factory the employees are protected from the weather, so that work can be carried on during the winter and on rainy days in summer without change in the character of the work and with approximately uniform efficiency. But farming is done outdoors, and the farmer is limited not only by weather conditions but also by the progress of the seasons, which require that practically all the crop operations, such as planting and harvesting, be done at a particular time of year. Moreover, the character of the work is constantly changing, and the labor problem is made still more difficult for the farmer to solve because of the fact that the amount of labor required to perform the different seasonal operations on the crops varies widely. In the South it is the chopping out, or thinning, of cotton and the picking of cotton that require the largest amounts of labor. In the wheat regions it is harvest time when the labor is needed; in the fruit regions, picking time. The cotton must be picked before a certain time or it will be discolored or lost, the wheat must be harvested or it will shatter or be damaged by weather, the fruit must be picked or it will fall and rot.

In other regions the amount of plowing that can be done during a certain period in the spring limits the acreage of crops. In some regions operations can be adjusted through apportioning crop acreages, so that a comparatively uniform distribution of work throughout the growing season is secured, but in other regions, particularly those where cotton, wheat, or fruit is the dominant crop, there will inevitably occur periods in the season when extra labor must be secured. In harvesting wheat, for example, a large army of transient labor must be assembled each summer in the wheat fields of the Central West. These considerations make the question of seasonal distribution of labor one of prime importance to the farmer.

While the figures shown on the maps and in the graphs and inscriptions that follow present only the usual dates and labor requirements, this limitation does not destroy their value as indicative of the seasonal labor requirements of crops in the country at large. A glance at the seeding dates given in the spring wheat maps, for instance, shows that in certain regions this operation begins about the 1st of April, that seeding becomes general about the middle of April and ends about the 1st of May. These dates are based on many reports of actual practice, and although what actually occurs in any given year may differ considerably, it is useful to know about when wheat seeding will need to be done. The wheat grower living in this region understands that the preliminary preparation of the land must precede planting. He must make allowance for time in which to perform these operations and crowd no large amount of other work into this period. This also applies in the production of other important farm crops.

NOTE.—The collection of information concerning the dates of planting and harvesting the crops and of performing other farm operations was first undertaken by the Bureau of Crop Estimates (at that time Bureau of Statistics) in 1910, and the work placed under the supervision of J. R. Covert. The results of a schedule forwarded to and returned by the county representatives and other agents of that bureau were edited, tabulated, and discussed by Mr. Covert and published as Bulletin 85, Bureau of Statistics, United States Department of Agriculture, in 1912. The demand for this bulletin, entitled "Seedtime and Harvest: Cereals, Flax, Cotton, and Tobacco," was so great that it was soon out of print.

In 1913, upon the inception of the project to prepare and publish an Atlas of American Agriculture, it appeared advisable to have more detailed data than were obtainable from these schedules, so with the cooperation of the Bureau of Crop Estimates and in collaboration with Mr. Covert, the Office of Farm Management prepared separate schedules for wheat, corn, potatoes, oats, cotton, grain sorghums, sugar beets, beans, tobacco, hay crops, rye, and barley, which have been forwarded from time to time by the Bureau of Crop Estimates to its list of township reporters, some 33,000 in number. It is the endeavor of that bureau to maintain one crop reporter in each township in the United States, who is selected, in so far as possible, from among the more successful and intelligent farmers in the township. The fullness and accuracy with which the schedules have been filled out is evidence of the loyalty and carefulness of these men. As evidence of the reliability of their reports it may be mentioned that the Office of Farm Management has collected independently a number of farm records of planting and harvesting crops extending back 20 to 30 years, and the average date derived from these records differed less than four days, and usually less than two days, from the mode of the dates (that is, the most frequent date) given by the township reporters in that locality.

The returns from these more detailed reports were mapped and some sixty of the maps were selected for publication in the Yearbook of the Department of Agriculture, 1917, under the title "A Graphic Summary of Seasonal Work on Farm Crops." The present circular is a revision of this Yearbook article, which is now out of print.

THE NORTHWARD AND SOUTHWARD MOVEMENT OF SEEDTIME AND HARVEST.

The most striking feature of the maps is the northward and upward movement of spring operations and events and the southward and downward progress in autumn. This movement progresses at a rate of approximately 1° of latitude, or 400 feet of altitude, in four days. Local climatic influences of the Great Lakes and of the Atlantic Ocean are evident on almost every map. In operations which may be performed during a long period the maps indicate for the most part only the effect of local competition for labor by other crops, although the underlying control of general climatic conditions is not wholly obscured. Local markets may hasten the harvest of certain crops, such as potatoes, near the large cities.

HOW THE MAPS WERE MADE.

In preparing these maps the dates for each operation were entered from the schedules returned by the township reporters on large county outline maps of the States.[1]

The altitude reported on each schedule was indicated also. In making the general maps showing dates by isochronal lines, a strict use of the individual reports was not possible. This is because there is for many crop operations a wide range of dates in the reports received from a county. Such differences are due (1) to the physical conditions, such as temperature, slope, drainage, and soils on each farm, (2) to the individual practice of the farmer, and (3) to the difficulty of estimating for some crops and operations the dates in a "normal or usual season" as requested on the schedule. Therefore, where it was reasonable to do so, county averages of the reported dates were used. Such averages sufficed for most of the operations in flat regions, especially for such definite events as the beginning of wheat harvest. Three sets of conditions, however, prevented the use of averages for all maps or for all parts of a map; large differences in elevation, two or more periods of planting, and, for certain operations, an extended period during which the work can be carried on. In a number of places east of the Rocky Mountains where the reports from different altitudes showed a well-marked topographic influence a contour map was used as an aid in drawing the isochronal lines. On most of the maps a heavy boundary line is drawn about the areas subdivided by the isochronal lines. Beyond such limits either the acreage was so small as to be of no significance or data were lacking. Where there were two or more well-defined planting periods the dates used were the modes, or the averages, of the most numerous group. Corn, spring oats, and late potatoes had to be treated in part in this way. Where the operation may be performed during an extended period the modal date was generally used, or the range in dates was shown

[1] For the basic data used in the preparation of the following maps and graphs the compilers are indebted to the township reporters of the Bureau of Crop Estimates, to several instructors and extension workers in certain agricultural colleges and experiment stations, and to a number of their colleagues in the Department of Agriculture.

on the map. In general, the maps show the average of the usual dates when most (not all) farmers perform the crop operation designated.

The usual dates of performing the various operations on the crops are in most cases not likely to change materially, but now and then conditions arise which demand that farmers alter considerably the dates when certain field operations are performed, such, for instance, as seeding winter wheat late because of Hessian fly (compare figs. 11 and 12).

THE LABOR GRAPHS.

The labor graphs that follow are based on records of labor distribution which the Office of Farm Management obtained from farms in widely different parts of the United States. Those from the northeastern quarter of the United States, where crops with dissimilar labor requirements associated with a fair amount of live stock characterize the farming, show a more uniform distribution of labor throughout the year than do those from the cotton belt or the wheat regions of the West, where the farming is characterized by crops with similar labor requirements associated with a small amount of live stock (compare figs. 1, 2, and 3 with figs. 4, 5, 6, and 7). While it is true that there are many economic advantages in choosing a combination of crops and live stock that will keep labor rather steadily employed throughout the year, it does not necessarily follow that such combinations are the most profitable under all conditions. There can be little question that the cotton farmer of the South or the wheat grower of the West would combine enterprises with a view to employing labor more steadily if such a combination would pay him best.

On the graphs showing labor distribution, each small rectangular area shaded represents a total of 100 hours' labor spent in a 10-day period. It will be noted that in many cases a white line divides the shaded portion of a 10-day bar into two parts. When this is the case the part below the white line represents the number of hours of labor on the farm supplying the record, and the part above represents the hours of labor put in by the farmer and his help on neighbors' farms, either given in exchange for help or, in some cases, paid for in cash by the neighbors. The records obtained do not indicate the time when neighbors gave labor in return, but undoubtedly some of the higher 10-day bars, especially those during the harvest season, when the practice of exchanging labor is most common, are the result in part of help received from neighbors.[2]

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[2] Persons who desire information beyond what is contained in this bulletin concerning transient labor in the wheat regions of the West, the labor requirements of field crops, and the geographical distribution of crops will find the following publications helpful:

The Harvest Labor Problem in the Wheat Belt. U. S. Dept. of Agr. Bulletin 1020.

Labor and Material Requirements of Field Crops, U. S. Dept. of Agr. Bulletin 1000.

Graphic Summary of American Agriculture. (Maps showing the distribution of crops and live stock in the United States.) U. S. Dept. Agr. Yearbook Separate 681.

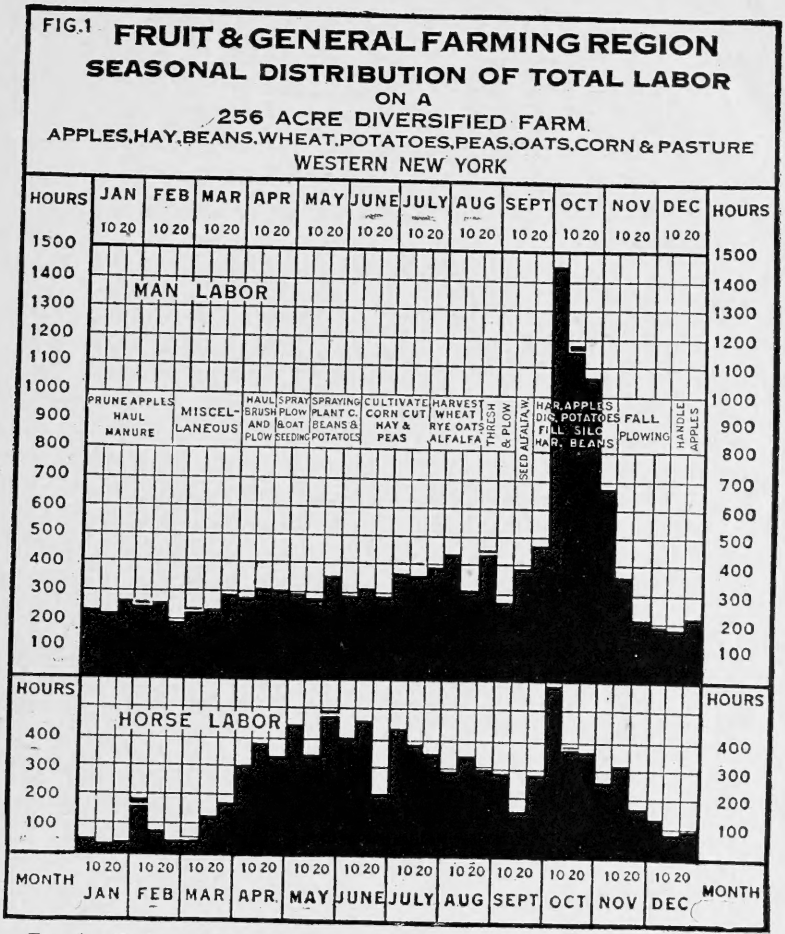
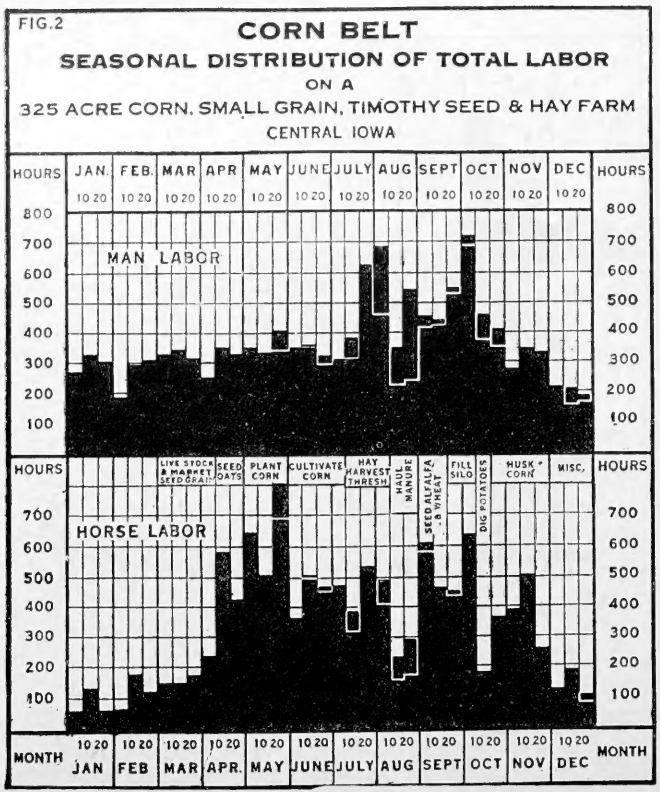
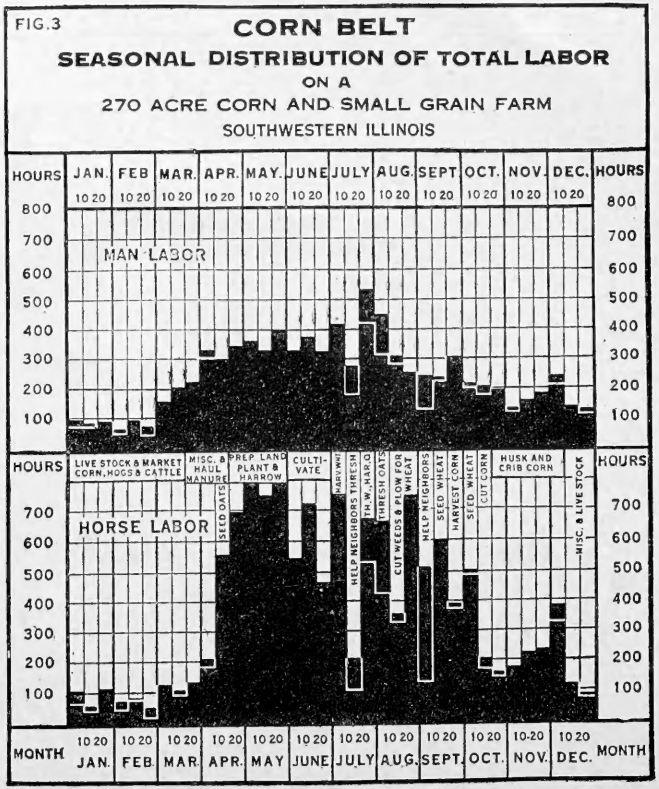


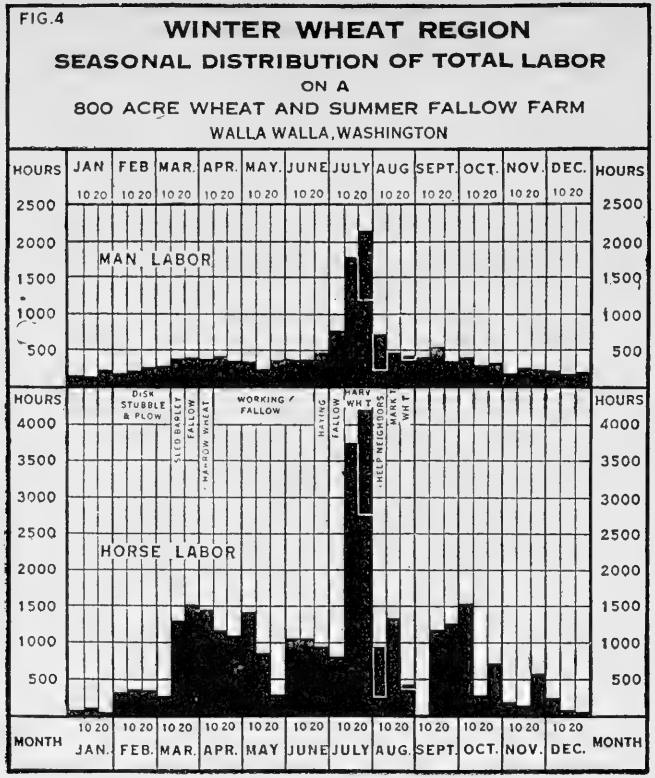
FIG. 1.—Fruit growing and general farming are the more common types of farming in western New York. The intensive fruit farms, which are found mostly within a few miles of the shores of Lake Ontario and Lake Erie and bordering the inland lakes, usually have only a few acres of farm crops. In the general farming area lying back of the fruit belt small to medium-sized apple orchards are found on many farms. The man-labor requirement on these diversified farms is quite uniform throughout the growing season with the exception of the haying and harvesting period in midsummer and again during the period of fall seeding and of bean, potato, and apple harvesting. The farm for which labor distribution is shown in the graph above is in a diversified farming region, and although an apple orchard is a common enterprise in this region, it is unusual to find an orchard so large in proportoin to other enterprises. There were on this farm in the year illustrated in the graph above 40 acres of apples in full bearing and 2 of pears, 48 of hay, 26 of wheat, 19 of beans, 19 of oats, 15 of peas, 12 acres of corn for silage, 9 acres of rye, 7 of potatoes, 7 of pasture, and a half acre of cabbage and other vegetables. Two men were hired by the year, another man was employed during July and August, and during the latter half of September 2 to 4 extra men were hired by the day. During October and early November a force varying from 8 to 24 in number was employed in packing and packing the apple crop. (Data supplied by C. M. Bennett, Agriculturist, Office of Farm Management.)

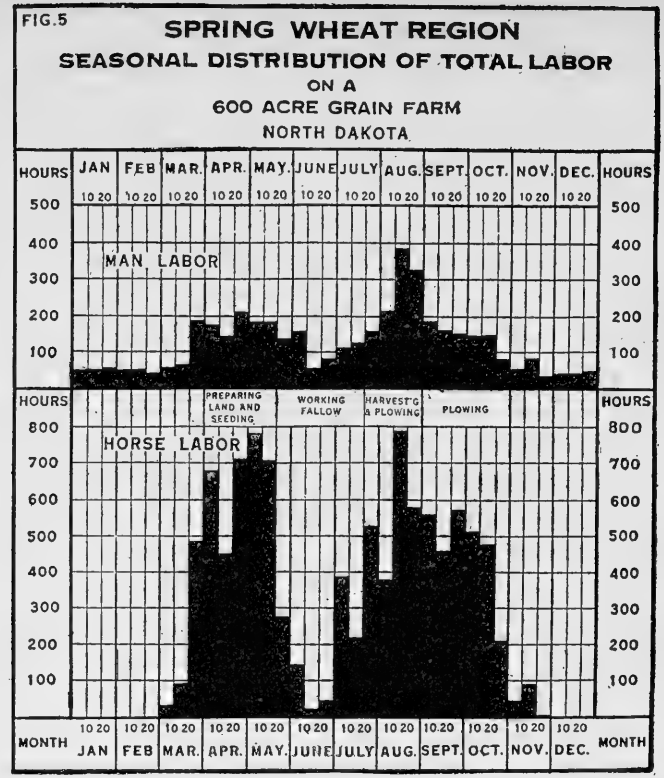
NOTE.—In the graph above and those that follow each small rectangular area in black represents a total of 100 hour's labor spent in a ten-day period. The white lines that sometimes divide the shaded area mark off time spent working off the farm.



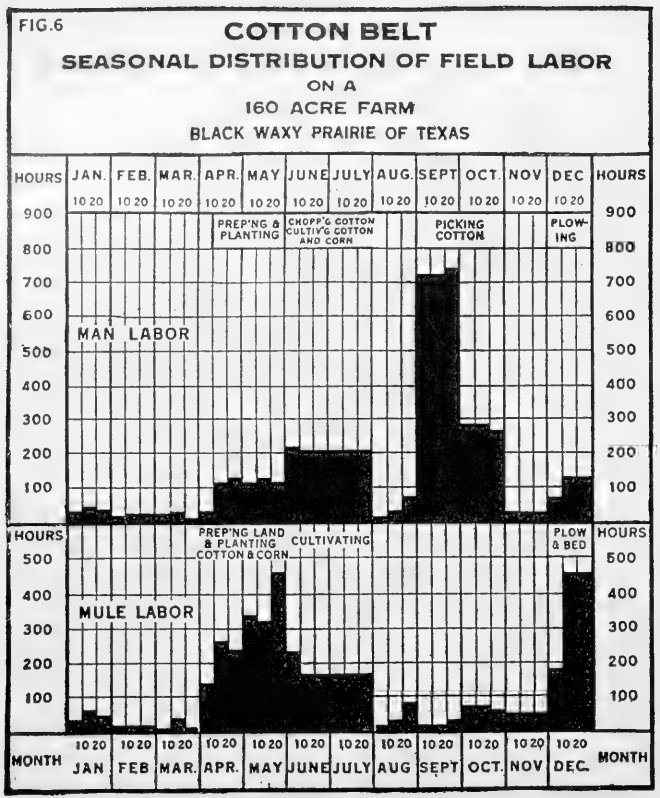


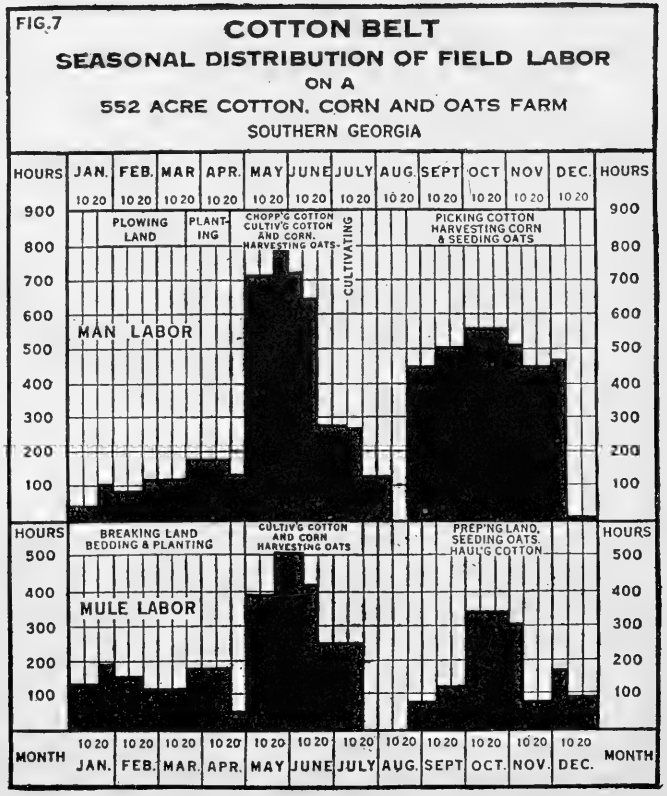
FIGS. 2 and 3.—In the corn belt, especially where small grain and hay are important crops and live stock is fed, the seasonal requirements of man labor are, perhaps, more evenly distributed than in other agricultural areas in the United States, except the dairy belt. The peak load of work is likely to occur the latter part of July and early August, when haying, harvesting and shock thrashing are in progress. The horse labor is less uniform in amount than man labor and reaches its peak load usually in April and May and again in the early fall. Where corn is cut for silage the peak load at this time is intensified. On the Iowa farm, which had 102 acres of corn, of which 26 were cut for silage, 48 acres of oats and a few acres each of barley, winter and spring wheat, together with 63 acres of hay, the farmer hires two men by the year, and when a larger crew is needed, exchanges work with his neighbors. The Illinois farm had 140 acres of corn, 54 of oats, 51 of wheat, and the labor, in addition to that of the farmer himself, consisted of two men hired during the season from March to December. He also exchanges labor with his neighbors. (Data supplied by C. M. Bennett, Office of Farm Management.)





FIGS. 4 and 5.—In the regions where wheat is the important crop, the heaviest demand for man labor comes at harvest time, which in North Dakota and Washington occurs during the latter half of August. In the spring-wheat region an earlier peak load, less accentuated but of longer duration, occurs during April and early May, when the preparation of the land and the seeding first of wheat and then of oats, barley or flax takes place. In eastern Washington work on summer fallow is also required at this time. On the Dakota farm, which had 280 acres of spring wheat, 127 acres of oats, 60 acres barley, 49 acres flax, 20 acres hay, and 52 acres fallow, 2 brothers did all the work except during the harvesting and thrashing season, August 1 to September 10, when 1 to 3 day laborers were employed. In this region it is customary to hire the thrashing done, the thrasher furnishing nearly all of the labor required. This labor does not appear on the graph. The eastern Washington farm had in this year 317 acres in wheat, 14 in emmer, 33 in pasture crops, and 374 acres of summer fallow. The labor force, in addition to the farmer himself, consisted of one man hired by the year and two men hired for the greater part of the year. The farmer hired, in addition, 10 to 20 transient laborers during two weeks of harvest time and exchanged labor with a neighbor. In eastern Washington wheat is harvested and thrashed in one operation by the combine. (Data supplied by C. M. Bennett.)





FIGS. 6 and 7.—In the cotton belt the peak load of man labor occurs when the small cotton plants are "chopped out," or thinned, and hoed during May, June, and early July, and again when the cotton is picked during the fall months. The greatest demand for mule labor occurs during late April to June, when both cotton and corn require cultivation and cowpeas are seeded, and again in the late fall and winter, when cotton is hauled to the gin, oats are seeded, and the land is plowed for next year's cotton and corn crops. In the northern portion of the cotton belt or on heavy soils farther south, the peak load of mule labor is frequently shifted to early spring. On the Texas farm, which had 117 acres of cotton, 16 of corn, 3 of oats, and 3 of sorghum, the farmer and three sons did all of the work, except picking. During September and early October a colored family of four was hired to help in picking cotton. The Georgia farm is more diversified than is usual in the South. It had 75 acres of cotton, 90 of corn and peanuts, 80 of oats, 3 acres of sweet potatoes, and 1 acre of sugar cane. The peanuts and sweet potatoes were "hogged off." The labor force consisted of five colored croppers, with a small amount of day labor hired to help in harvesting oats. The cotton and corn were all grown by the croppers, the other crops by the farmer. (Data supplied by R. E. Willard and E. S. Haskell, Office of Farm Management.)

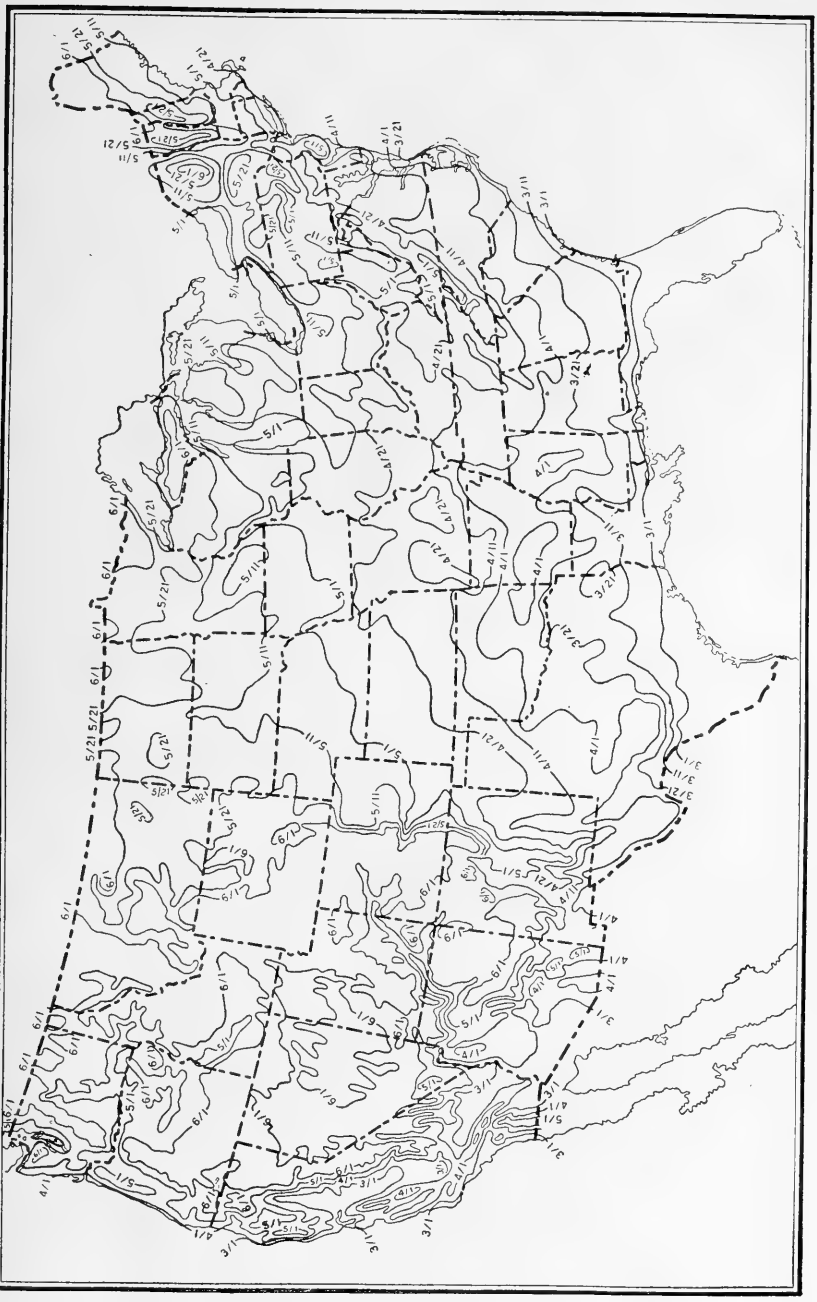


FIG. 8.—The average dates of the last killing frost in spring. Map much reduced and generalized from a map prepared by the United States Weather Bureau and published in the Frost and the Growing Season section of the Atlas of American Agriculture.

FIG. 9.—Average dates of the first killing frost in fall. Map much reduced and generalized from a map prepared by the United States Weather Bureau and published in the Frost and the Growing Season section of the Atlas of American Agriculture.

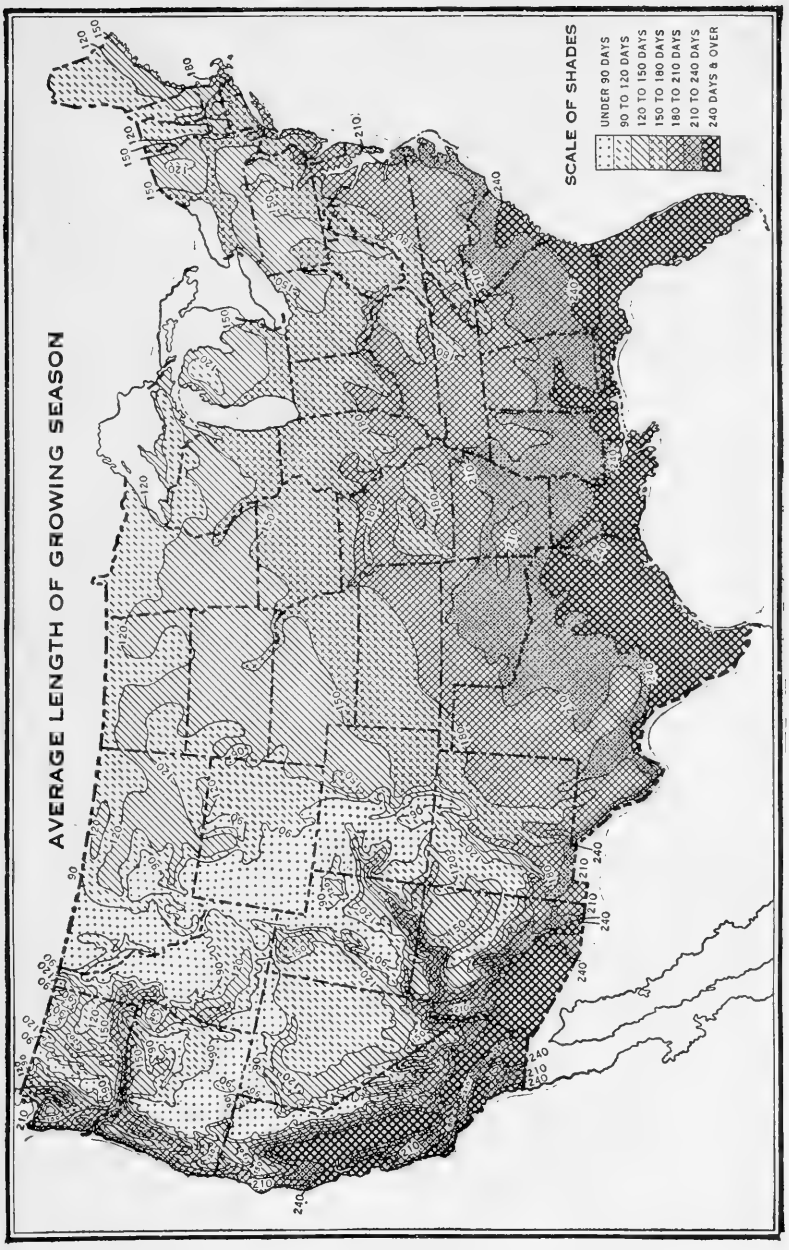


FIG. 10.—Average length of the growing season. Map much reduced and generalized from a map prepared by the United States Weather Bureau and published in the Frost and Growing Season section of the Atlas of American Agriculture.

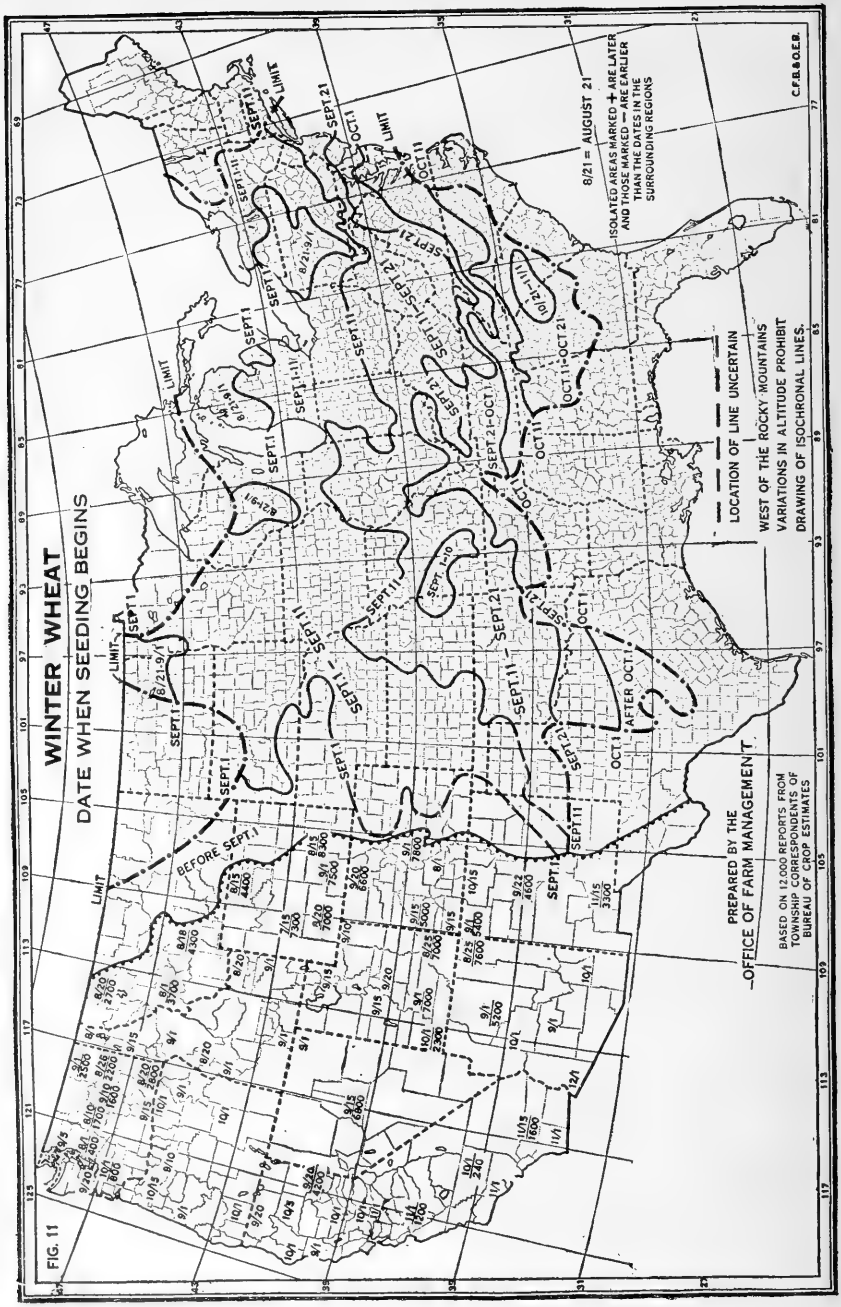
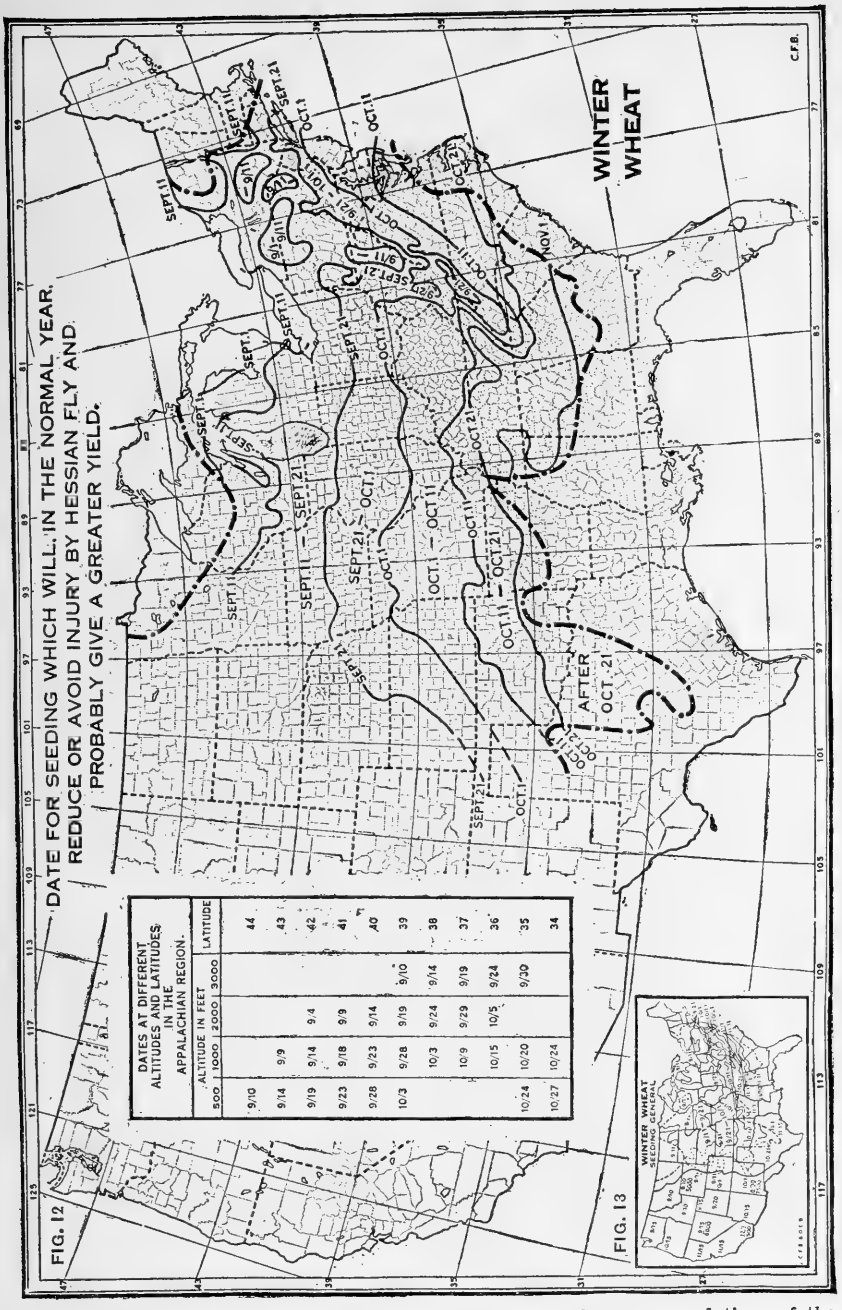


FIG. 11.—Kansas and Nebraska have nearly one-third the winter wheat acreage in the United States. Seeding begins in central Nebraska about September 1 and ends in Texas about October 1. In southwestern Illinois, southern Indiana, and northeastern Maryland, other important centers, seeding begins usually about September 21. In eastern Kansas, Missouri, southern Illinois and Indiana, Kentucky, and Tennessee, the seeding dates shown on the map, which represent the practice of most farmers, are so early as to invite injury by the fly in practically every year. It is a serious problem to seed late enough to avoid injury by the Hessian fly and yet early enough to give the wheat a good start before winter sets in.

In this and succeeding maps the heavy dot-and-dash line represents the boundary of the crop, beyond which either the acreage is so small as to be of no significance or else the data are insufficient to permit drawing isochronal lines.



FIGS. 12 and 13.—This map is an attempt to correlate the recommendations of the different experiment stations as to the date of seeding winter wheat. The results of experiments in Kansas, Nebraska, Iowa, Indiana, and Ohio show that when the Hessian fly is prevalent the best yields may be expected when the seeding occurs just after the emergence of the last autumn brood of the fly; and when the fly is not numerous, the best time for seeding is about a week earlier. In the years when the fly is prevalent the actual dates to be recommended depend on experiments in the fields at the time, so in such years it is necessary to follow closely the recommendations of the State entomologists. Planting in the north depends largely on the season and the labor situation. South of the thirty-ninth parallel and east of southeastern Kansas the autumn is long enough to allow seeding after the average date of emergence of the fly, with the best chance of still securing the maximum yield.

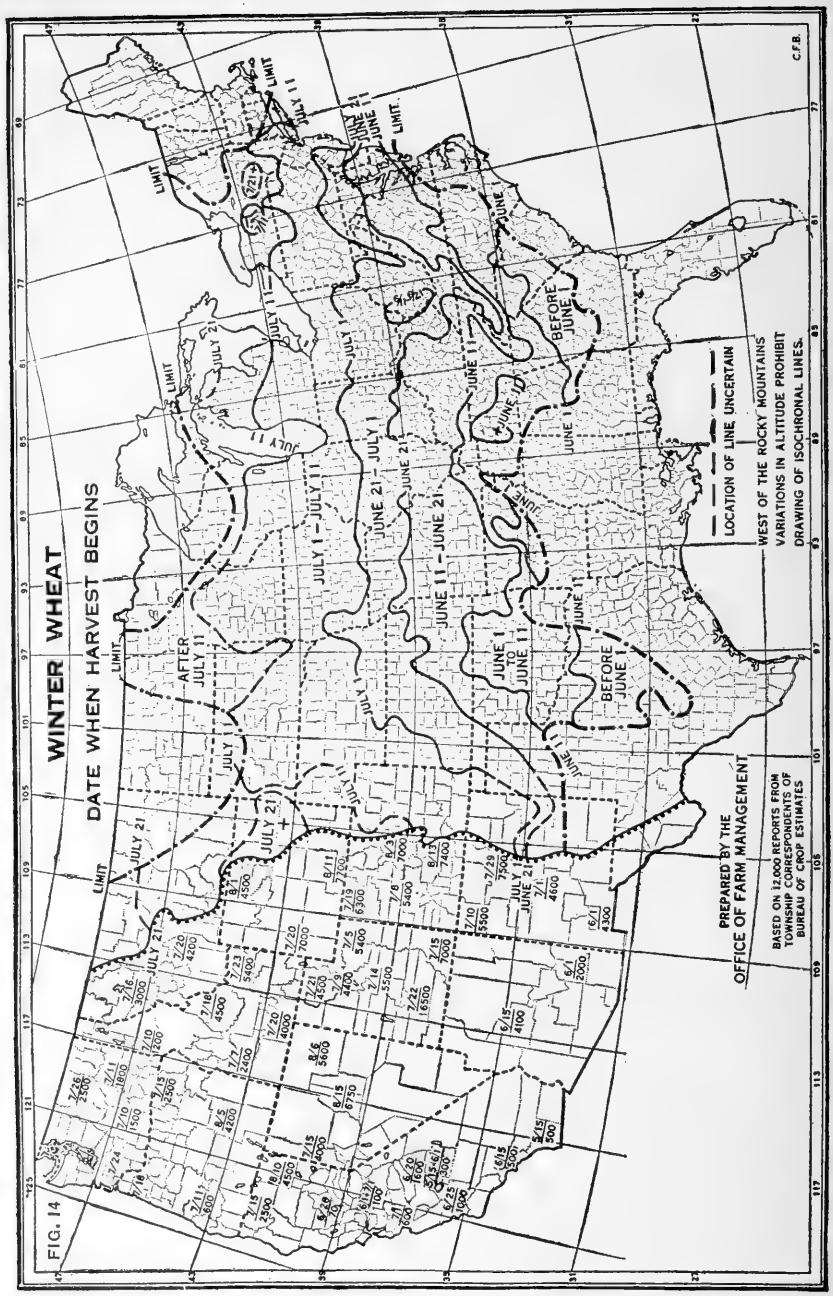
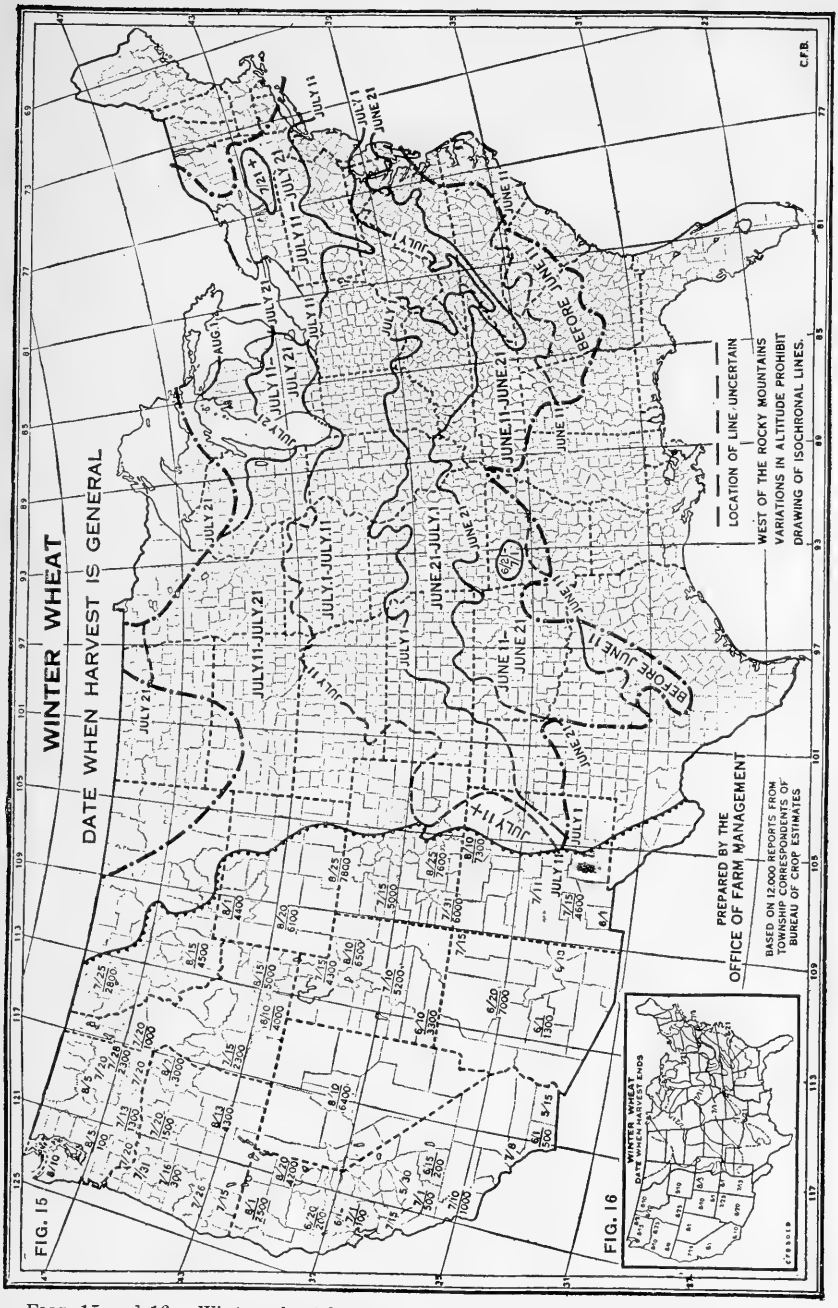


FIG. 14.—The harvest of winter wheat begins in central Texas usually about May 25, but is of little importance until central Oklahoma is reached about June 5. In this section the army of transient harvest hands begins to assemble, and reaches its maximum size in central Kansas, where the harvest begins usually about June 15. By June 25, in the normal year, there are 50,000 transient laborers, it is estimated, working in the wheat fields of Kansas. Part of them have come in from the South, upon completion of the harvest there; part of them have been gathered from the cities and other centers of employment in the East, largely by the public and private labor agencies in Kansas City and other points; and in part the army is composed of local labor assembled from adjacent towns and villages. By July 1 harvest has begun in south-central Nebraska, and the harvest army, constantly disintegrating and being reinforced by fresh recruits, is busy in the wheat fields of that State.



FIGS. 15 and 16.—Winter-wheat harvest becomes general in central Oklahoma usually about June 15, in central Kansas about June 25, in southern Nebraska about July 5. In southwestern Illinois, southern Indiana, and eastern Maryland it is general usually from June 21 to July 1. Along the northern margin of the winter-wheat region in New York and Michigan, and also in eastern Washington and Oregon, harvest is general about July 21. Two weeks after harvest is general it is over in all these regions except in eastern Washington and Oregon, where the harvest may not be finished before August 20 or 25. Records indicate that the average amount of labor required to harvest an acre of wheat in southeastern Pennsylvania, western Illinois, and Kansas is about 3 man and 4 horse hours, and in thrashing about the same amount. In California, with a combine harvester, the figures are 2 man and 10 horse hours per acre; and in eastern Washington, with combine, 2 man and 8 horse hours, without a combine 1.5 man and 3 horse hours to harvest and 4.5 man and 4.5 horse hours to thrash an acre.

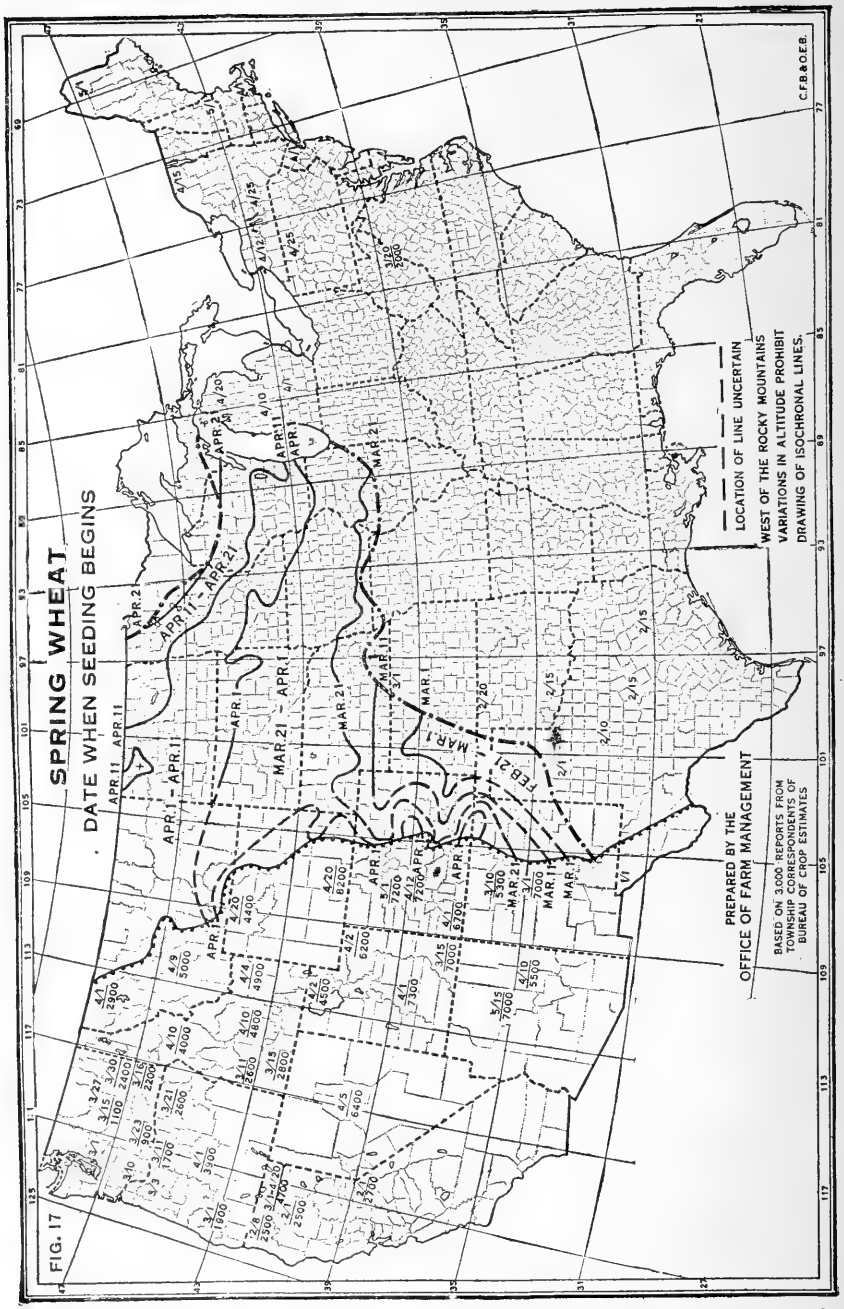
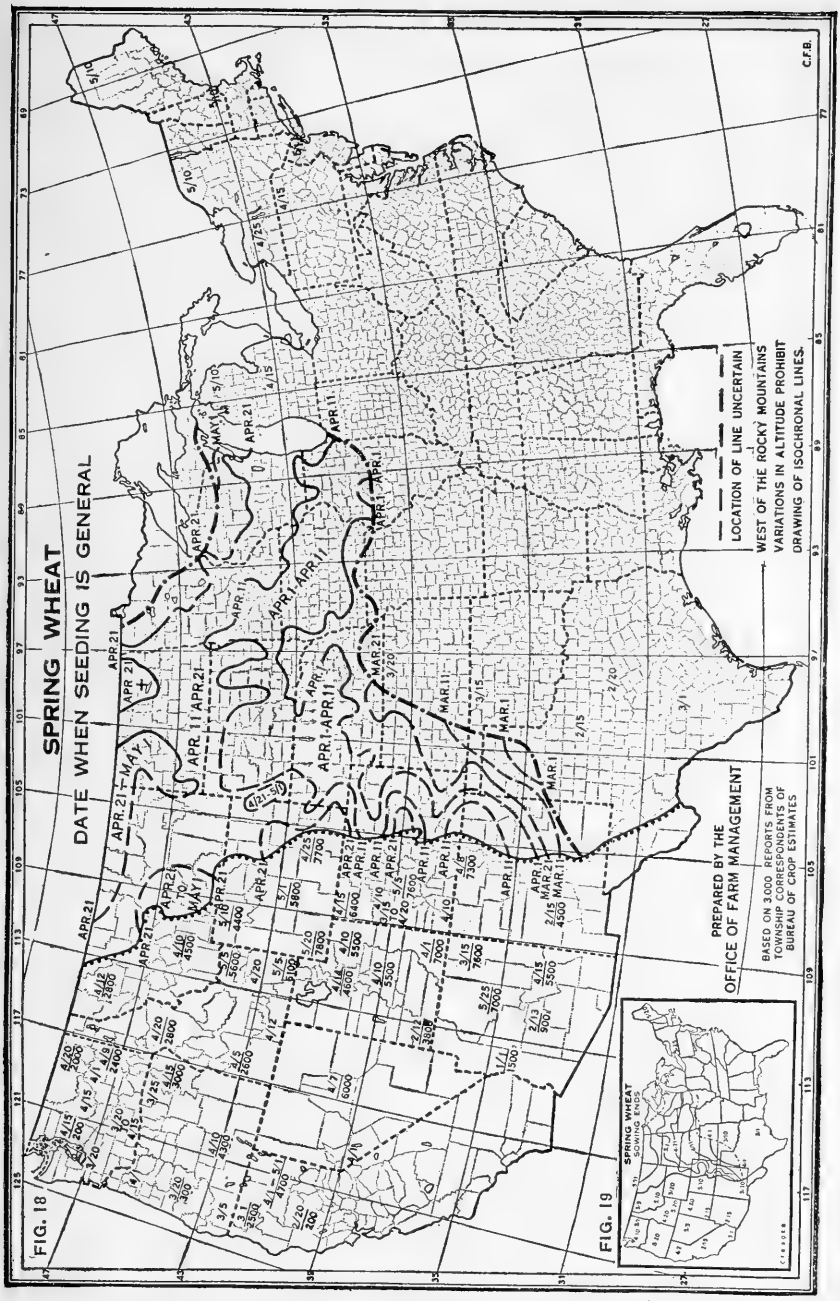


FIG. 17.—Minnesota, the Dakotas, and eastern Washington produce over three-fourths of the spring wheat grown in the United States. Lines are drawn on the map only for those areas east of the Rocky Mountains having in general over 100 acres per county in the census year 1909. The seeding of spring wheat begins in northeastern Nebraska and western Iowa usually about March 21, and during the following ten days it begins throughout most of South Dakota and in Minnesota south of the Minnesota River. By April 11 it is beginning in northern North Dakota and north central Minnesota. Along the margin of the spring wheat belt in northern Minnesota and at higher altitudes in the West seeding usually does not begin until April 21 or even later.



FIGS. 18 and 19.—The seeding of spring wheat becomes general in southern South Dakota usually about April 1 and in northern North Dakota about April 21, or some 10 days after the beginning date. In the Big Bend and Palouse districts of eastern Washington seeding is general during the first half of April. The usual duration of the period from beginning to end of seeding is about 20 days in Nebraska, where the acreage is small, 30 days in northern South Dakota, and 35 days in northern North Dakota. In eastern Washington it is 30 to 40 days. In the Dakotas and Montana seeding wheat requires on the average a half hour of man labor per acre and two hours of horse labor. The amount of land that can be seeded is dependent not only upon the supply of labor and efficient use of machinery in fall plowing, and in the plowing and seeding after the land thaws out in the spring, but also upon weather conditions during both these periods.

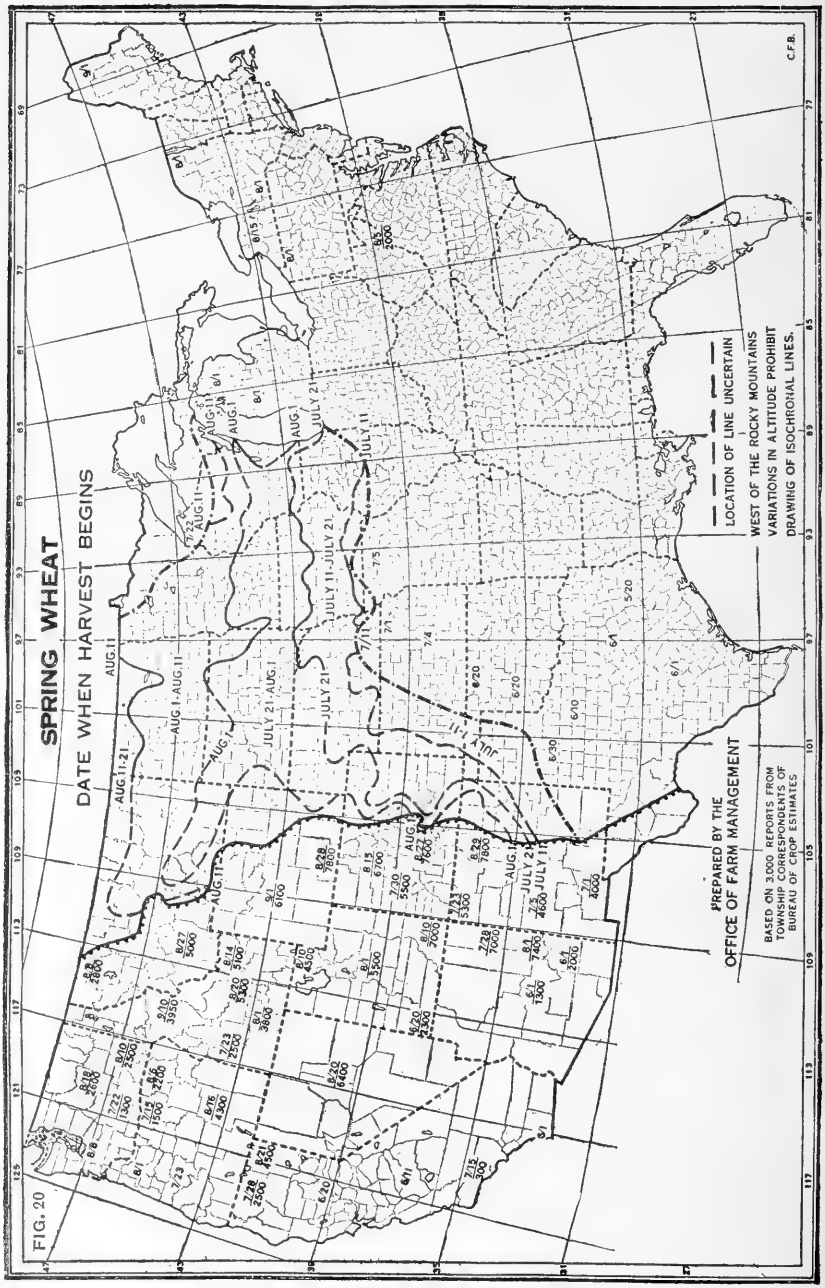
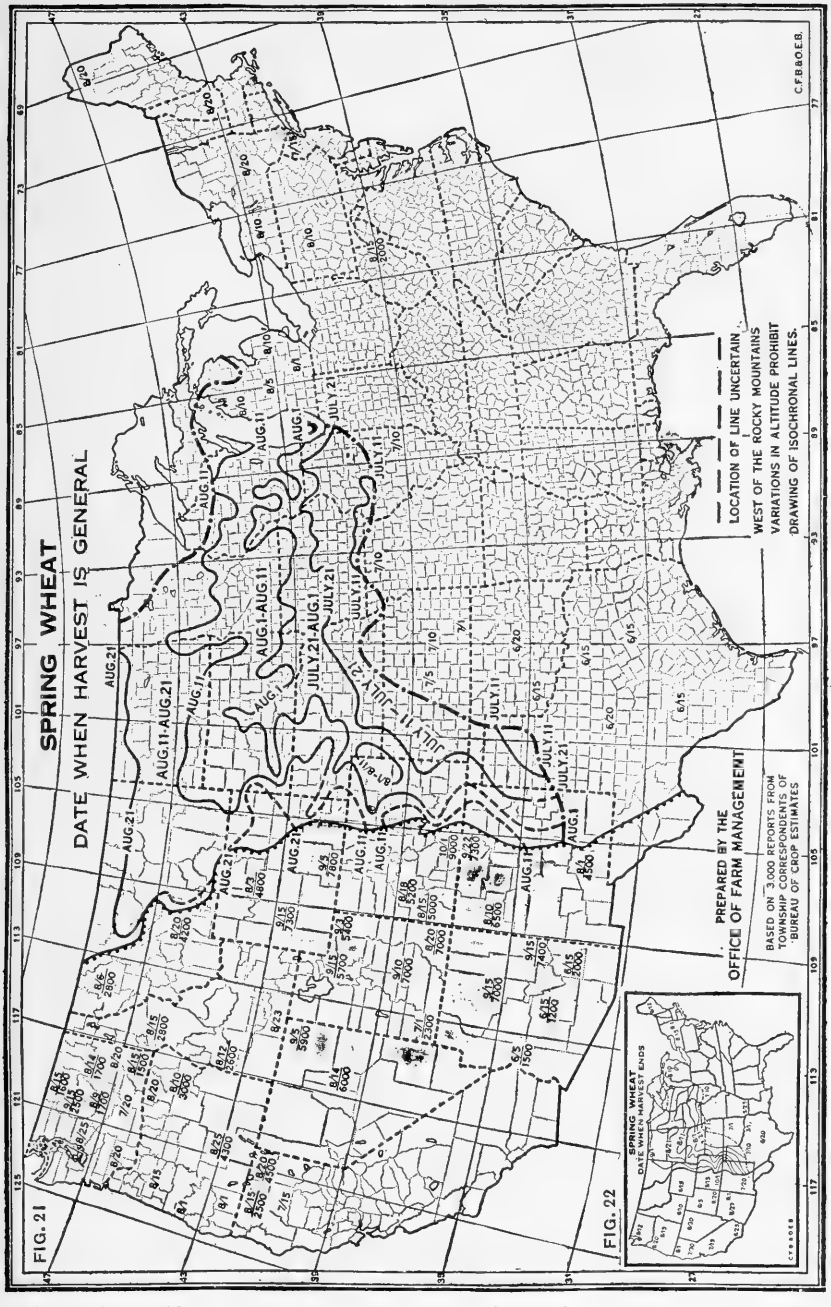
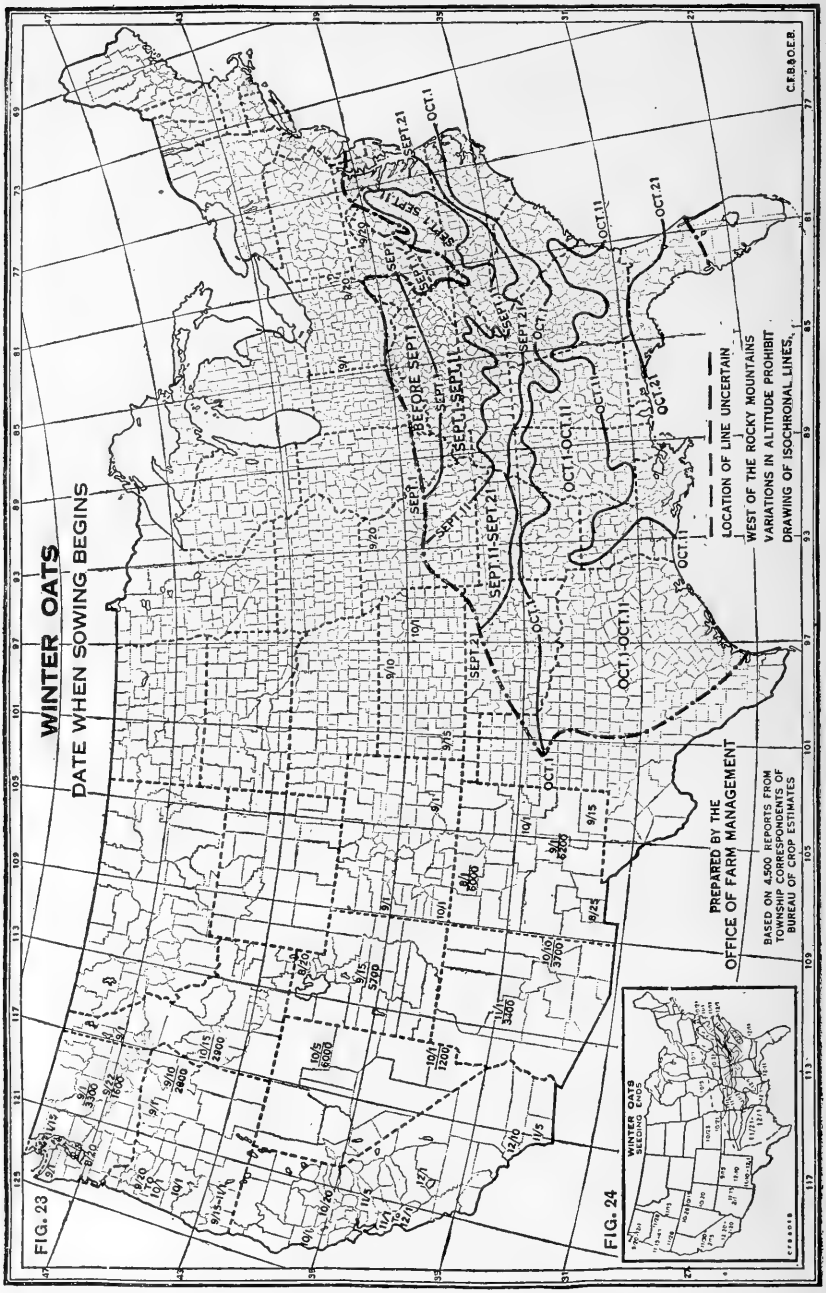


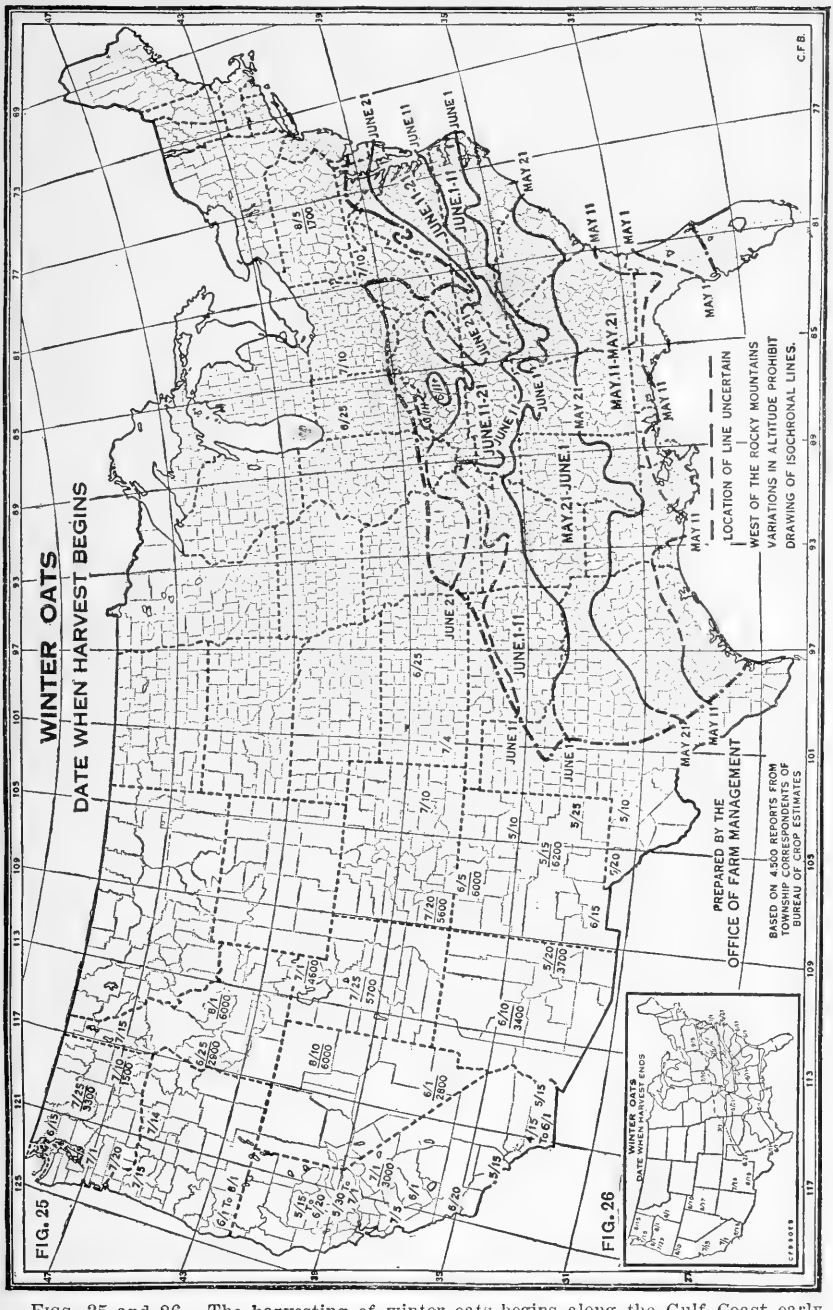
FIG. 20.—The harvest of spring wheat begins in eastern Nebraska and western Iowa usually about July 15, or at the time winter wheat harvest ends. By August 1 wheat harvest has usually begun throughout practically all of South Dakota and southern Minnesota and by August 11 it has nearly reached the Canadian line. In eastern Washington and Oregon spring wheat harvest begins usually about July 15 in the warmer river valleys, but not until August 10 on the higher, cool plateaus. The transient labor supply for the harvest in Minnesota and the Dakotas, estimated at 30,000 to 40,000 men, comes mostly from States to the south where it has been employed in harvesting winter wheat, and from the logging camps in the Great Lake region. In Washington and Oregon the local supply is depended on, supplemented by laborers from the logging camps and mines.



FIGS. 21 and 22.—Harvest becomes general in the southern portion of the spring wheat States usually by August 1 and is over by August 11. Along the Canadian border harvest becomes general by August 21 and is practically over by September 1. Most of the spring wheat in the United States is harvested in the normal year between July 20 and September 1, and practically all by September 20. Records from North Dakota show that it requires, on the average, about 3 hours for a man with four horses to plow and prepare an acre for wheat, a half hour to seed an acre, 1 to 2 hours to harvest an acre, using only 2 or 3 horses, 3 hours to thrash an acre, of which two-thirds is the labor of a hired crew, and 1 hour to market the wheat, a total of about 9 man hours and 21 horse hours of labor per acre. In the eastern Palouse district of Washington the average total amounts are 9 man and 29 horse hours; in the Big Ben region, including labor on summer fallow, 8 hours of man and 45 hours of horse labor.



FIGS. 23 and 24.—Winter oats are grown mostly where the average winter temperature exceeds 35 degrees, and hence are important only in the regions south of the Ohio and Potomac rivers and along the Pacific coast. Seeding begins in the Ohio and Potomac valleys usually about September 1 and ends about October 1; along the northern margin of the cotton belt seeding begins about September 21 and may continue 30 to 50 days; and finally in northern Florida it begins about October 21 and is over by December 15. In western Washington seeding takes place usually during September, in Oregon during September and October, and in California mostly during October and November. Winter oats in all these sections are mostly a minor crop and seldom require extra labor. In the South plowing, harrowing, and seeding an acre of oats requires in general 6 to 10 hours of man labor and 13 to 20 hours of horse or mule labor. To produce an acre of winter oats requires from 10 to 20 hours of man labor.



FIGS. 25 and 26.—The harvesting of winter oats begins along the Gulf Coast early in May and progresses northward across the cotton belt at the rate of 10 to 15 miles a day, reaching the northern boundary of the cotton belt about June 11 and the lower Ohio and Potomac valleys usually by June 21. The winter oat harvest ends along the Gulf Coast usually by June 1, and in the Ohio and Potomac valleys before July 11. Along the Pacific Coast the harvest of winter oats begins in western Washington during the latter part of June or early July and may last into August; in western Oregon it begins usually during the first half of July and is over by August 1; and in California the harvest begins from mid-April to July 1, varying with locality and farm practice, and ends usually 4 to 8 weeks later. In the South it requires in general about 8 hours of man labor and 6 hours of mule labor to harvest an acre of oats, except in central Texas, where only half as much man labor is required.

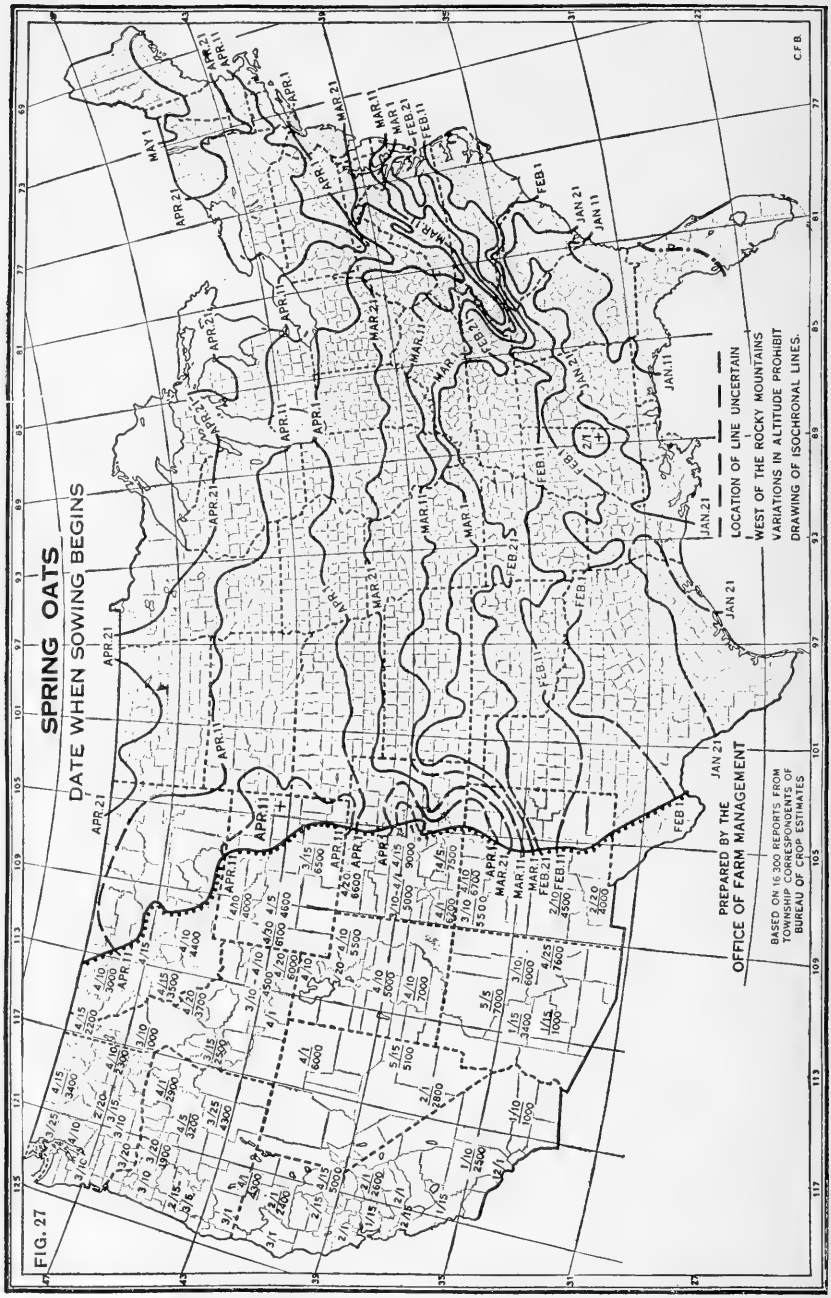
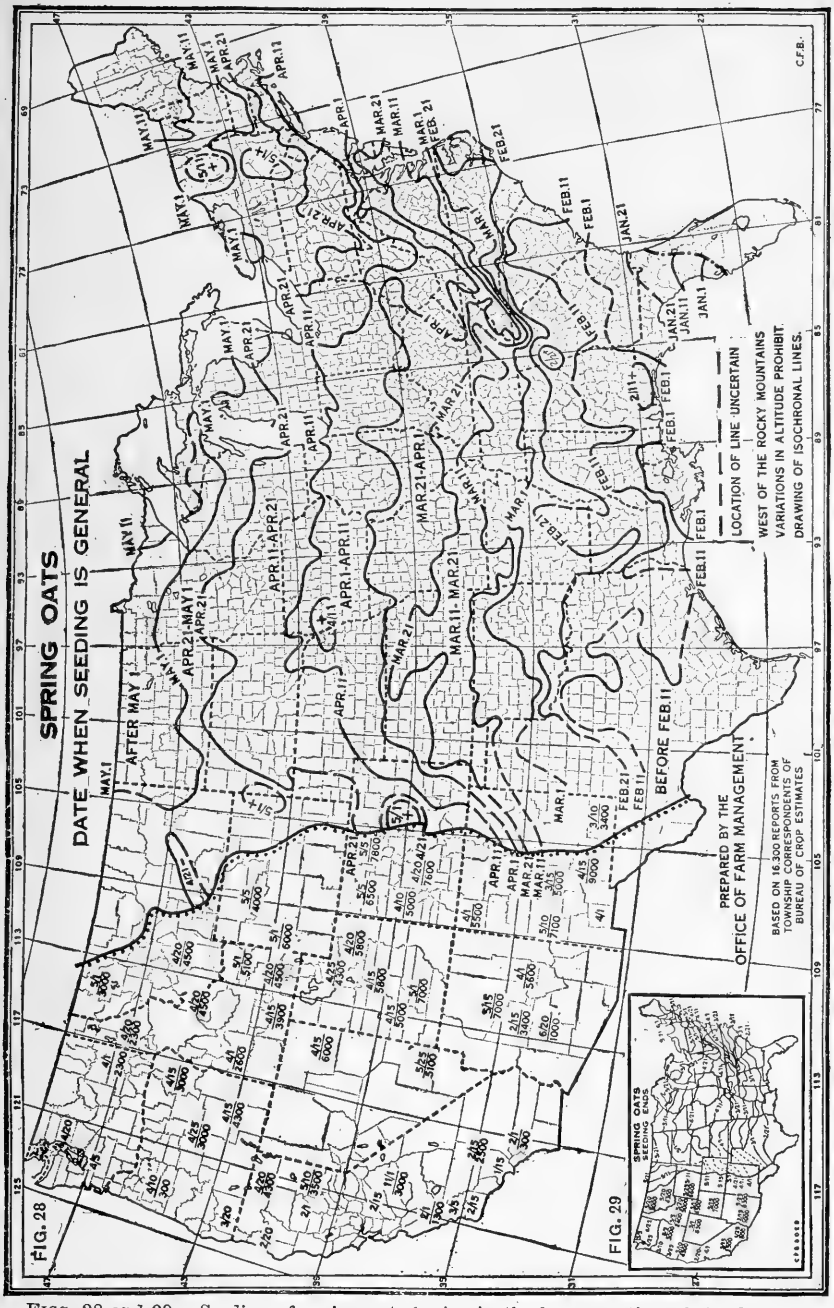


FIG. 27.—The spring oat belt consists of a crescent-shaped area extending from New England to North Dakota, bounded on the north by the Great Lakes and on the south and west by a curved line across central Ohio, Illinois, eastern Nebraska, and thence northward along the Missouri River. In the corn belt oats are sown in the spring before corn-planting time and harvested in July after the corn is laid by. There is, therefore, very little competition with the more profitable corn crop for labor at critical times of year. In the spring wheat region of the Northwest there is some competition for labor between the seeding of oats and wheat, but as the oats are generally sown 10 days later than the wheat they serve to lengthen and make less strenuous the seeding season. Outside the oat belt described above, spring oats are not a sufficiently important crop to affect seriously the requirements for farm labor.



FIGS. 28 and 29.—Seeding of spring oats begins in the lower portion of the Ohio and Potomac River valleys about March 1 to 15 in the normal year, is general March 21 to April 1, and is over by April 11 to 21; in central Illinois seeding begins about March 21, is general usually April 1 to 11, and ends about April 15; in northern Iowa it begins about April 5, is general about April 11, and ends about April 21; and along the Canadian line in North Dakota it begins about April 21, is general about May 5, and is finished by May 21. In western New York seeding begins usually about April 15, is general by May 1, and is over by May 15. The preparation of land for oats in east central Illinois requires about two hours of man labor per acre and eight hours of horse labor, while for drilling about a half hour of man labor and an hour of horse labor are required. In other parts of the country the labor required for this operation appears to be 50 to 100 or more per cent greater.

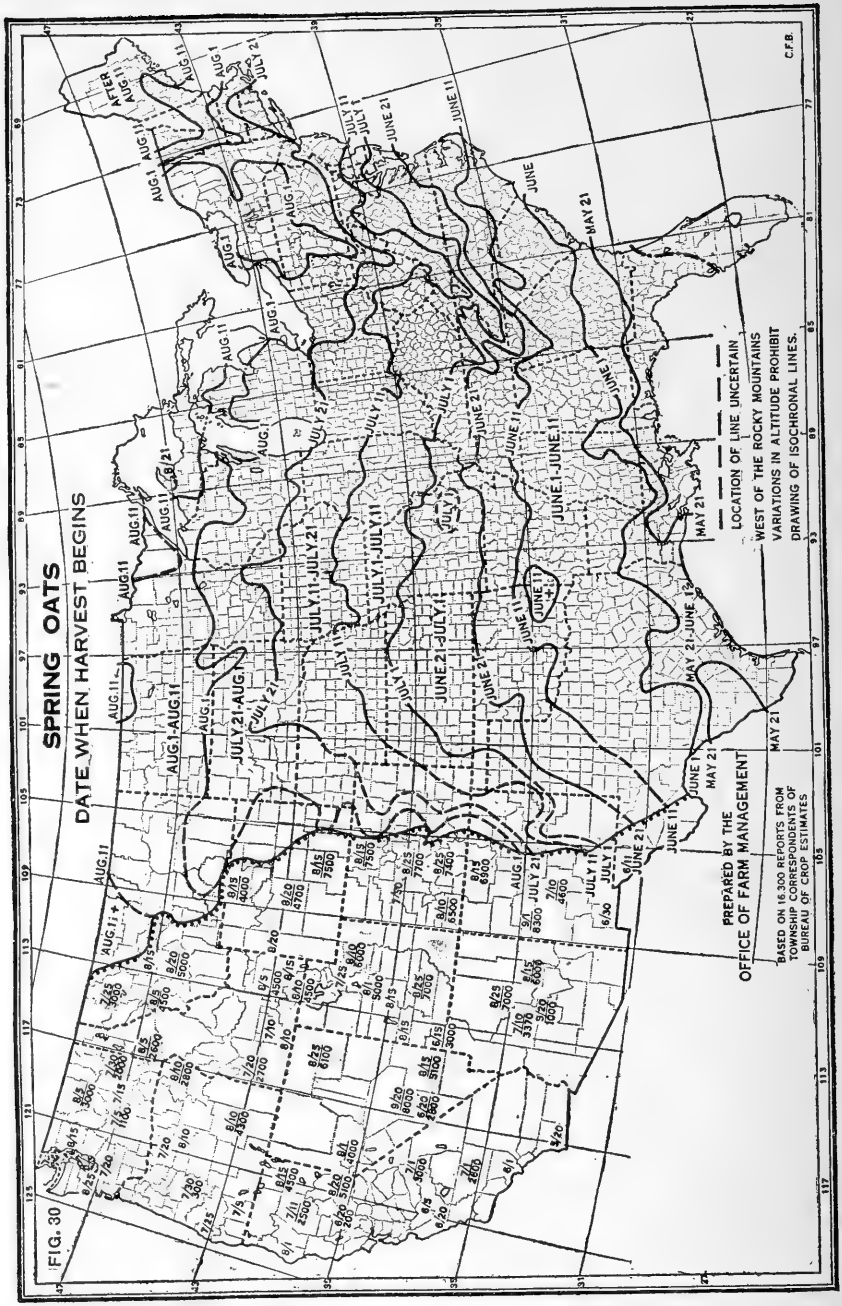
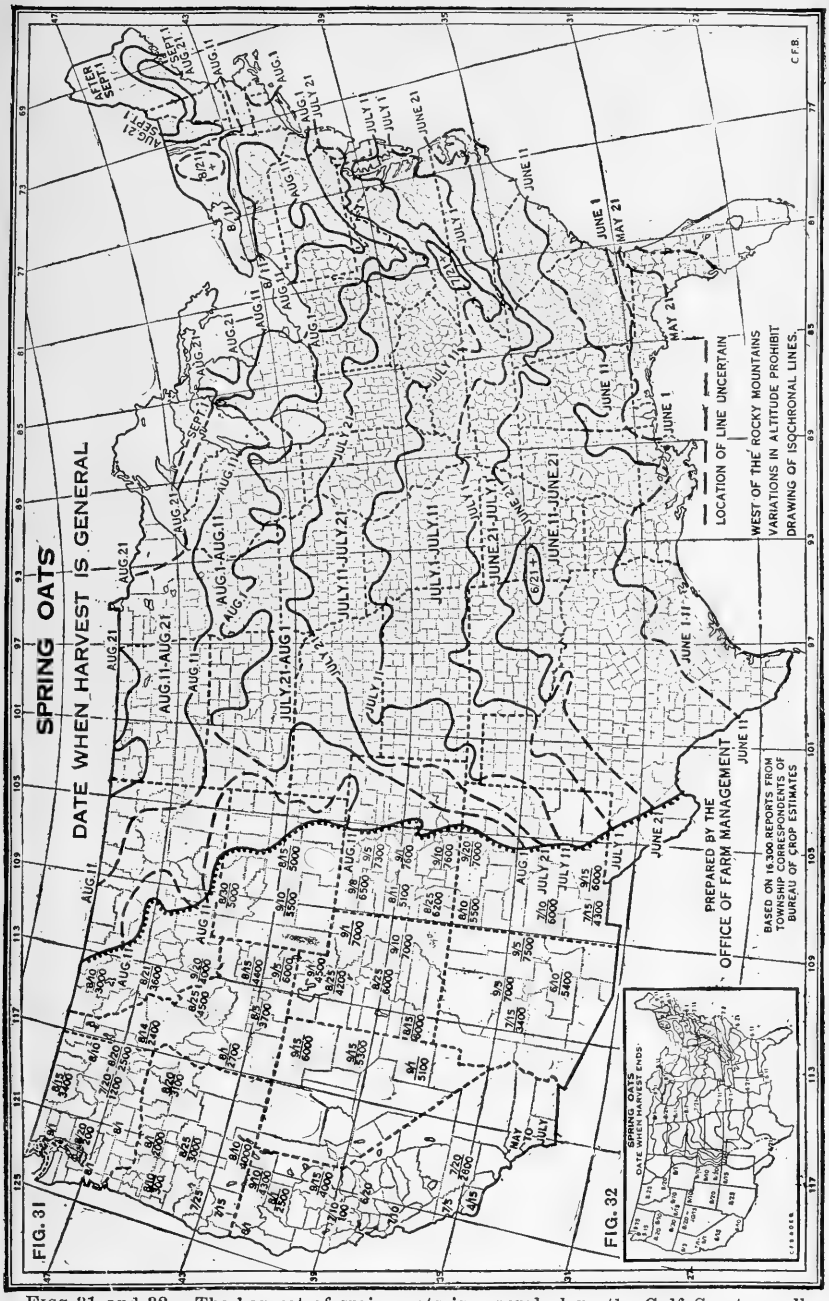


FIG. 30.—The harvest of spring oats begins along the Gulf Coast usually about May 21 and progresses northward up the Mississippi Valley at the average rate of 14 miles a day until about August 11 it crosses the boundary into Canada. Along the Atlantic and Pacific coasts the rate is somewhat less rapid. In central Illinois, central Iowa, and eastern Nebraska, in which States nearly one-third of the total oat acreage of the United States is found, the harvest usually begins about July 11. In east central Illinois about 2.5 hours man labor and 3 to 4 hours of horse labor are required to cut and shock an acre of oats. In North Dakota the labor required for harvesting averages 2 hours of man labor and 4 hours of horse labor per acre, while in western New York the corresponding figures are 3.5 hours of man labor and 3.5 hours of horse labor per acre.



FIGS 31 and 32.—The harvest of spring oats is general along the Gulf Coast usually about June 11, but it is July 1–11 before the harvest is general in eastern Kansas, the lower Ohio and the Potomac valleys. This is about the time wheat harvest ends. By mid-July oat harvest is general in central Iowa, central Illinois, and southern Ohio, and by mid-August in western Washington, North Dakota, and New York. Oat harvest is considerably later in the eastern States than at the same latitude and altitude in the central and far West. In Minnesota, the Dakotas, and eastern Washington oat harvest seriously overlaps upon that of spring wheat. The total amount of labor required to produce an acre of spring oats, including thrashing, averages about 10 hours of man labor and 20 hours of horse labor in east central Illinois, 8 hours of man labor and 20 hours of horse labor in North Dakota, 20 hours of man labor and 25 hours of horse labor in western New York.

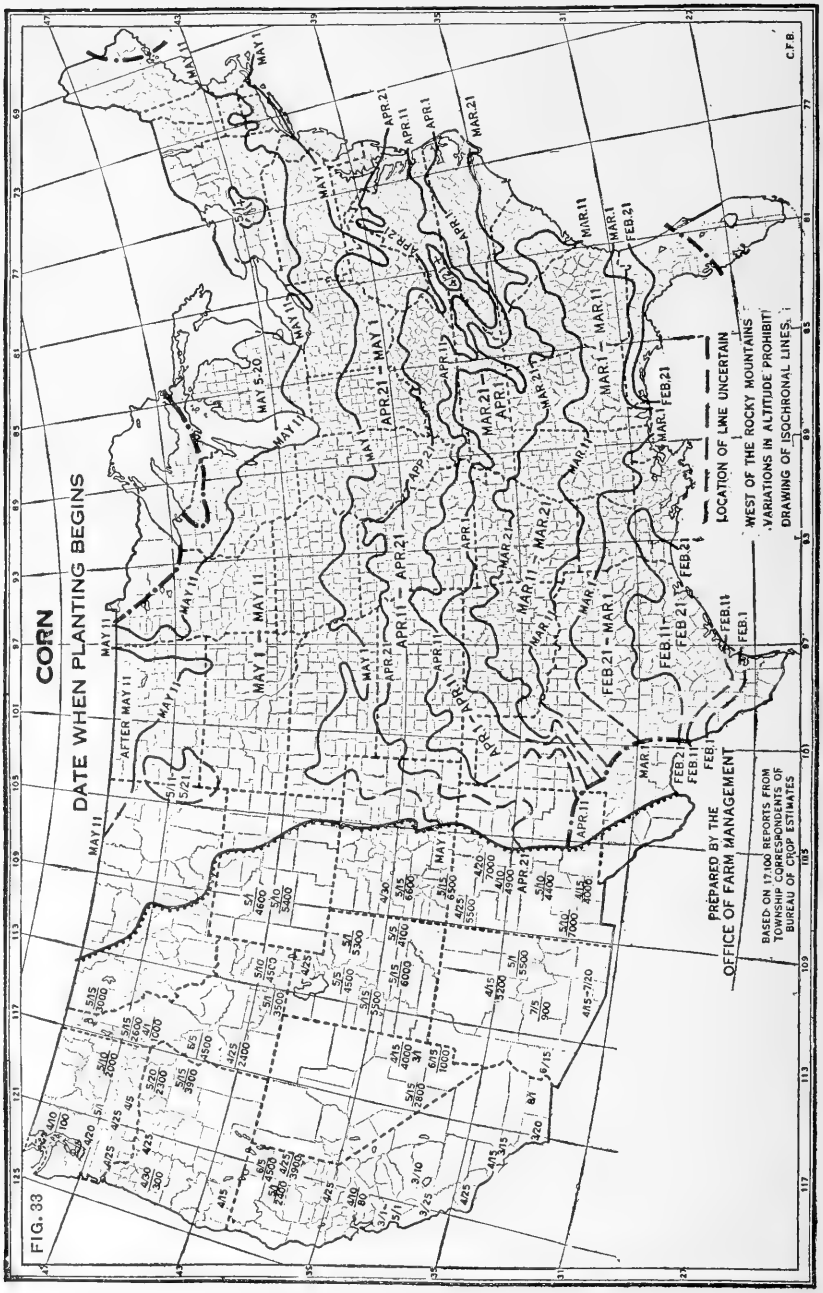


FIG. 33.—Planting corn begins usually before February 1 in extreme southern Texas and progresses northward at an average rate of 13 miles a day until by May 1 it has begun generally in central Nebraska, north central Illinois, and central Ohio. During the next 10 days corn planting begins in practically all regions where it is grown northward to the Canadian line. Throughout the great corn States of Ohio, Indiana, Illinois, and Iowa, and in southern Wisconsin, Minnesota, and South Dakota corn planting is general about May 15. In New York and northern and eastern Wisconsin it is general the last week in May. Planting is completed throughout the corn belt usually by June 1. In the South there are often two important planting periods during the season, an early planting before cotton planting and a late planting usually in June, after the planting and chopping out of cotton is completed.

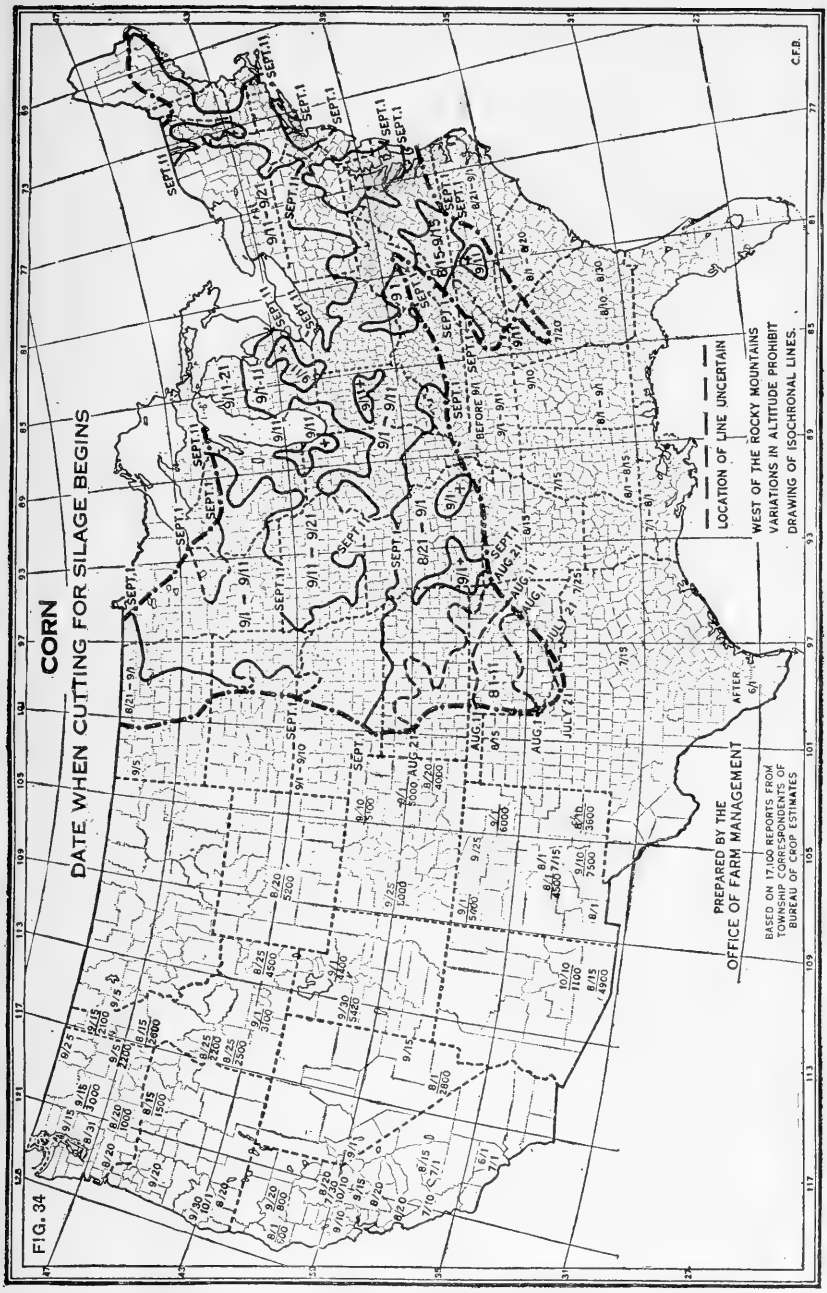
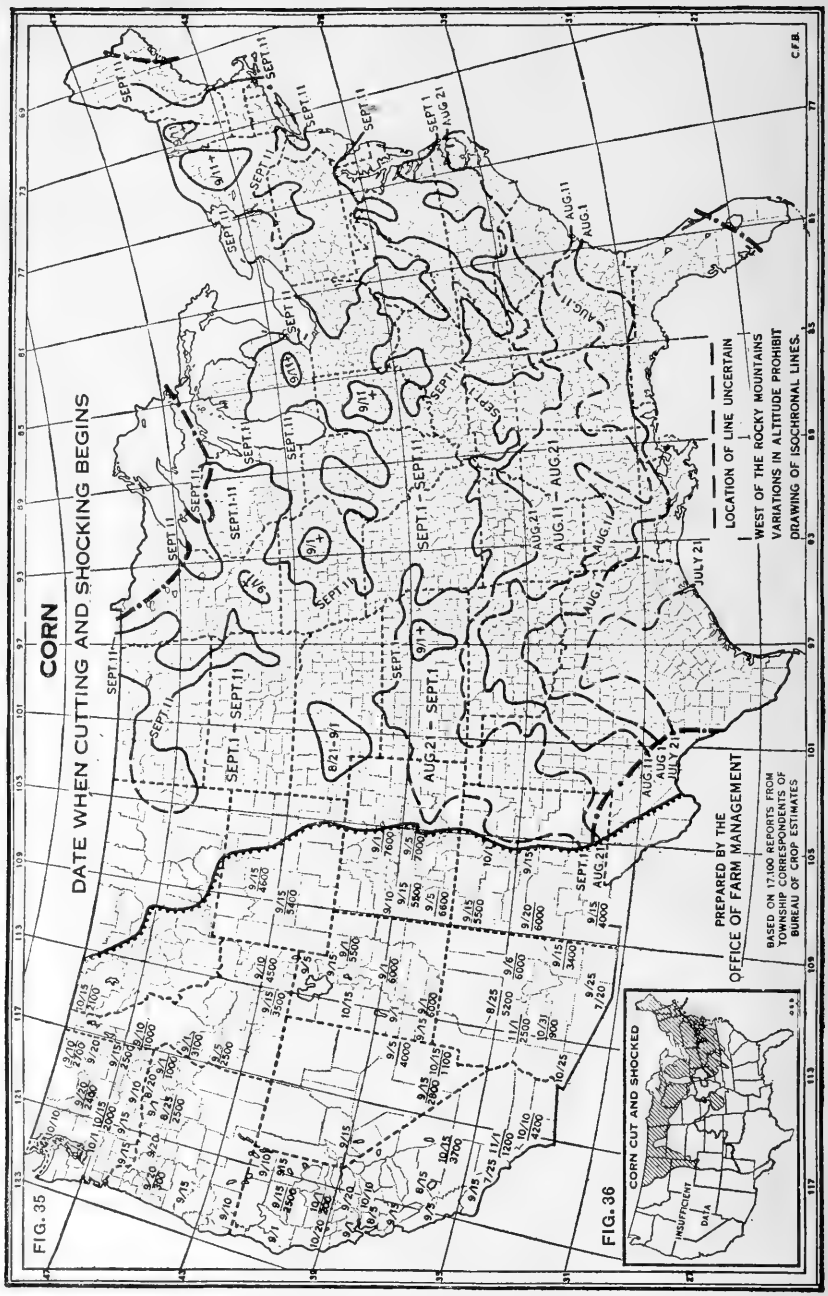
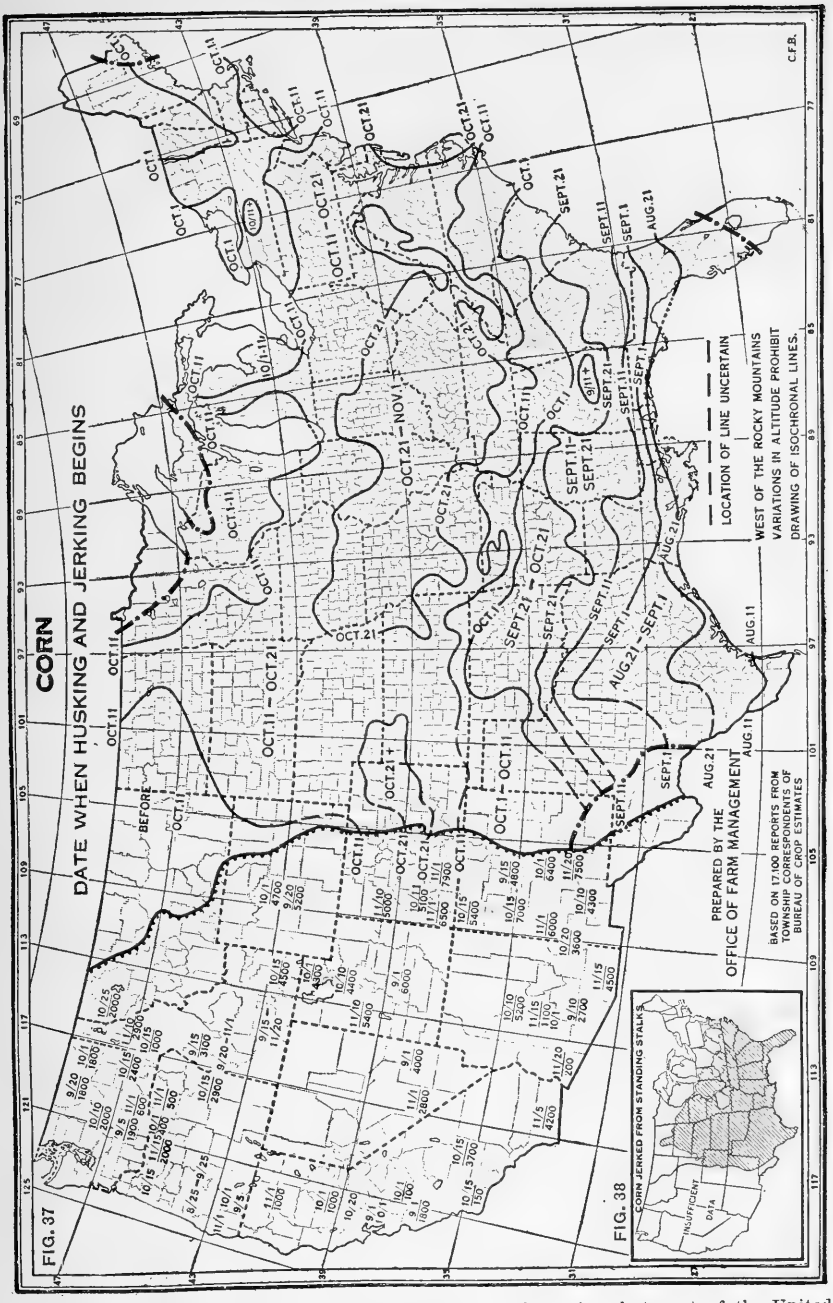


FIG. 34.—The construction of silos has progressed most rapidly in the Northern States, where dairying is more widely developed than in the corn belt and corn does not have as long a season in which to mature. It is estimated that 50 per cent of the corn acreage in New York is now cut for silage, 36 per cent in Wisconsin, 11 per cent in Minnesota, 14 per cent in Kansas, and 9 per cent in Illinois. In Kansas, Missouri, and Virginia cutting for silage usually takes place during August. Throughout the dairy and northern corn belt States cutting and putting up silage occurs during September. This operation requires the labor of several men and in dairy districts especially it is often difficult to secure sufficient help. Records from Wisconsin indicate that cutting corn for the silo requires on the average about 3 hours of man labor and 6 hours of horse labor per acre, while filling the silo (including cutting corn in the field) requires about 16 hours of man labor and 17 hours of horse labor per acre of corn.



FIGS. 35 and 36.—The cutting and shocking of corn is the common practice in the dairy States of the North and in Ohio, northeastern Kentucky, West Virginia, and most of Virginia and Maryland, also in the eastern Ozark region of Missouri. Cutting begins throughout this entire area between September 1 and 21, and is general from Iowa eastward to New York, Tennessee, and Virginia during the last 10 days of September. In the hill lands of New England and New York, in northern Wisconsin and from Iowa northward, westward, and southward it is general between September 10 and 20. The dotted line on the small corner map shows where the beginning of cutting and shocking of corn occurs, on the average, at the same time as the beginning of seeding of winter wheat.



FIGS. 37 and 38.—The small insert map (fig. 38) shows in what part of the United States it is the common method to husk or jerk corn from the standing stalks. This operation begins in the Southern States during September (in central Texas and Florida during August) and becomes general during October. In the heart of the corn belt husking from the standing stalk begins during the latter part of October and continues into December. The amount of labor required for this operation, as shown by records from Iowa and Illinois is about 6 hours of man labor and 12 hours of horse labor per acre. The stalks are plowed under later in the fall or in the spring. Little transient seasonal labor is employed in the culture of corn.

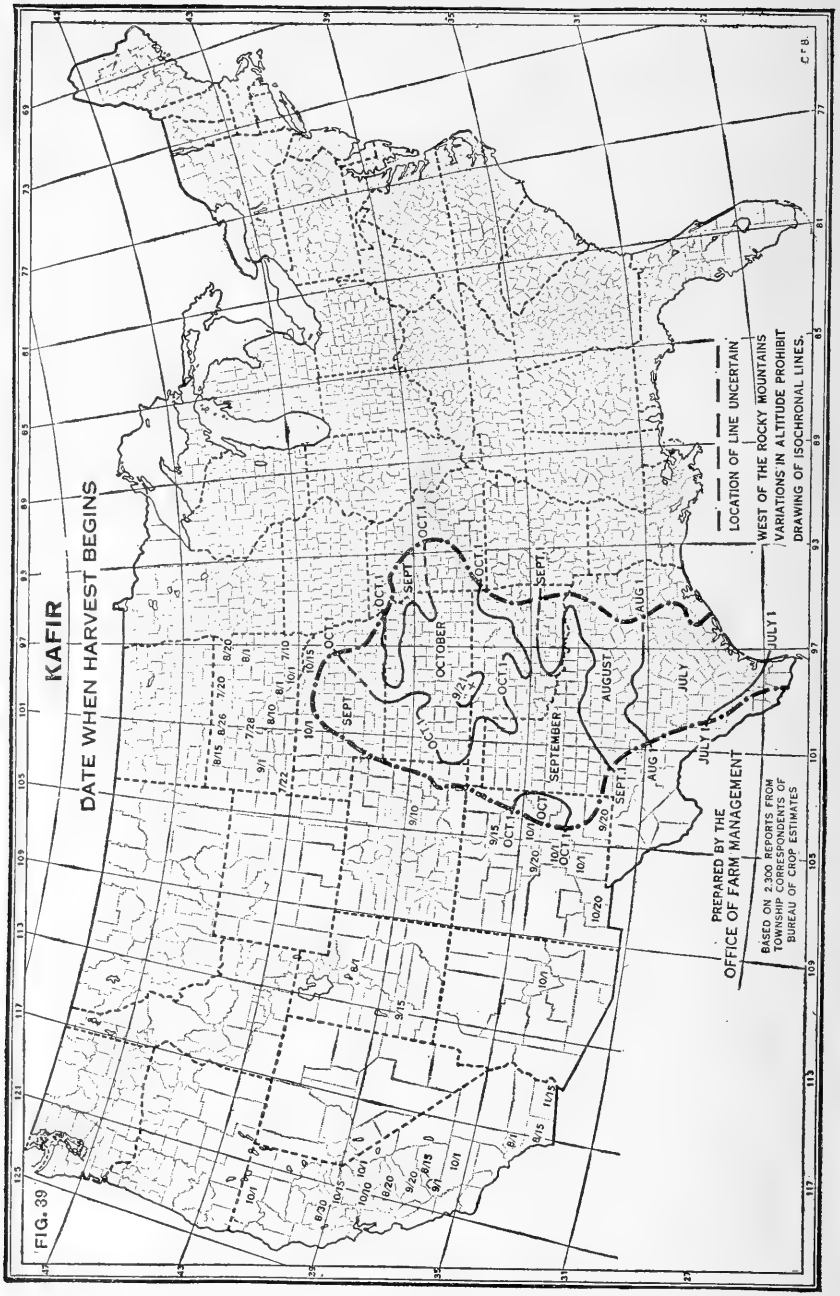


FIG. 39.—Kafir is confined practically to the Southwestern States where, owing to its drought resistant character, it has become an important crop. It is both harvested for seed and cut for forage. As kafir is a comparatively new crop, farm practice in its culture is not as well established as with other staple crops, while the long growing season and vicissitudes of rainfall over much of its range not only permit but enforce wide latitude in dates of planting and harvest; hence, it has been possible to draw lines on the map only by 30-day rather than by 10-day periods. Very little transient labor from outside is used in harvesting kafir corn. In northwestern Texas records show an average labor requirement for harvesting and thrashing of 7 man hours and 9 horse hours per acre.

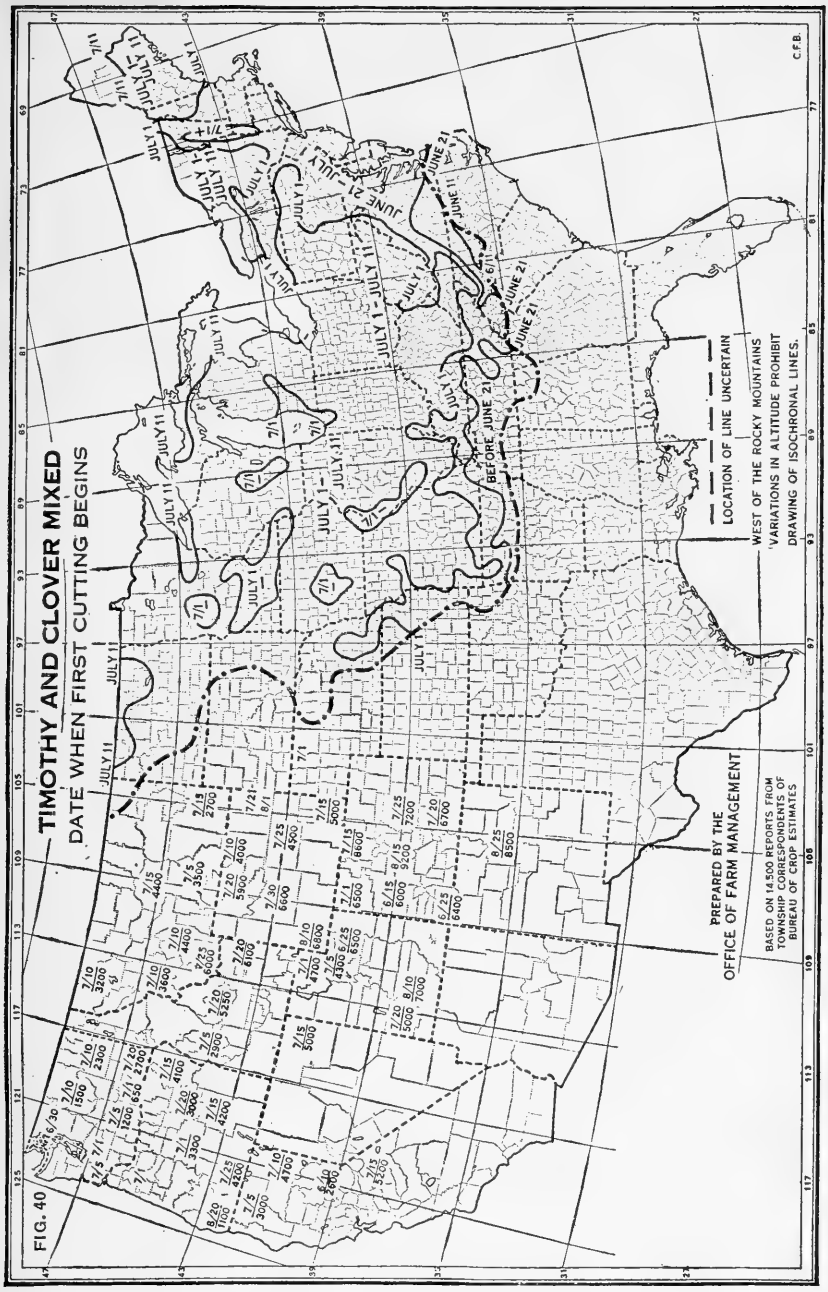


FIG. 40

FIG. 40.—Timothy, sown separately or mixed with clover, is the principal hay crop in the corn belt and in the eastern, northern, and Pacific northwestern dairying regions of the United States. In the hill lands of New York and in northern Wisconsin it constitutes over one-half of the acreage of all crops, and hay-making time becomes the busiest period of the year. In the corn belt the cutting of clover hay frequently occurs at the same time as the last cultivation of corn and as a result there is a heavy demand for labor at this time of year. Little transient labor is used, however, in cutting and curing hay. Throughout the region of greatest production the cutting of timothy and mixed hay begins usually about July 1. Along the southern margin of the belt it may begin one to two weeks earlier and along the Canadian border one to two weeks later. In general, the average amount of labor required to cut, rake, and haul to the barn is about 8 man and 8 horse hours per acre.

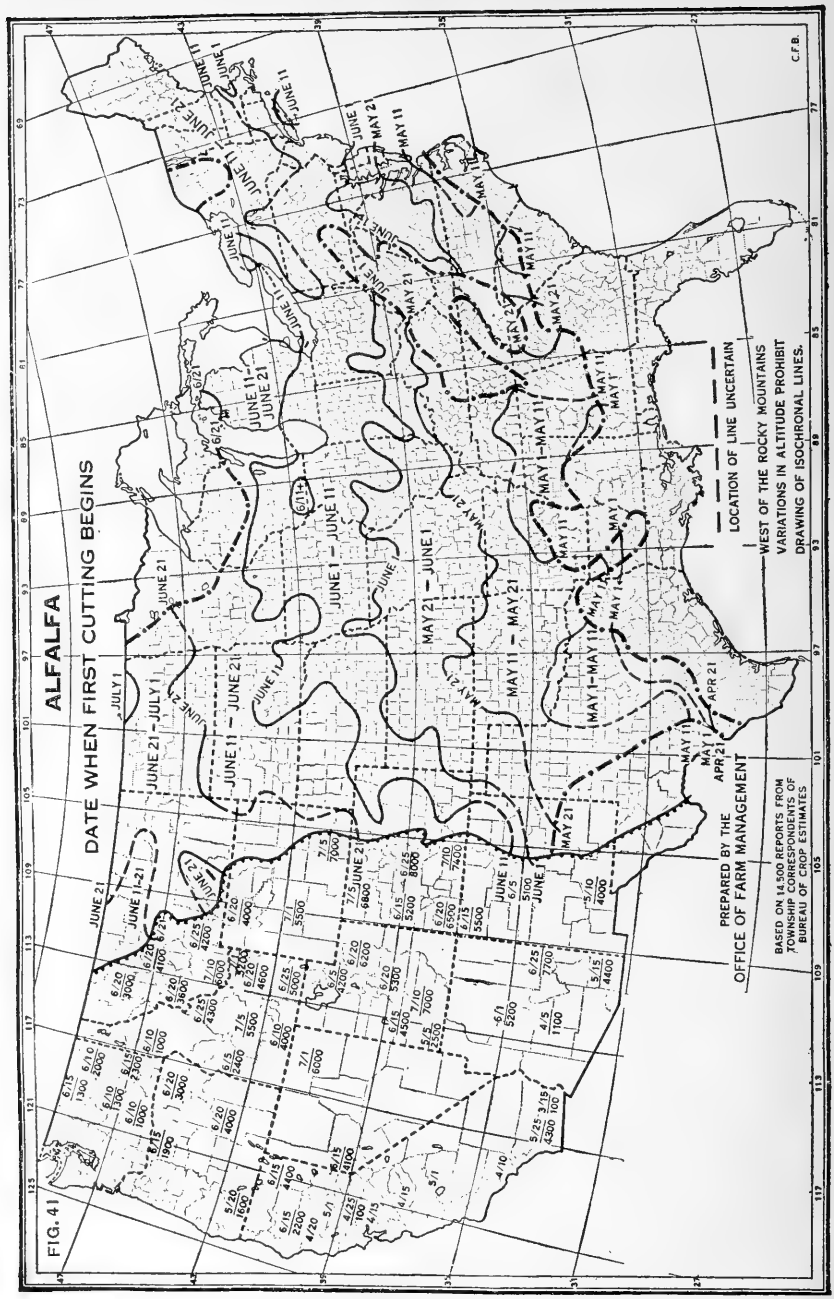
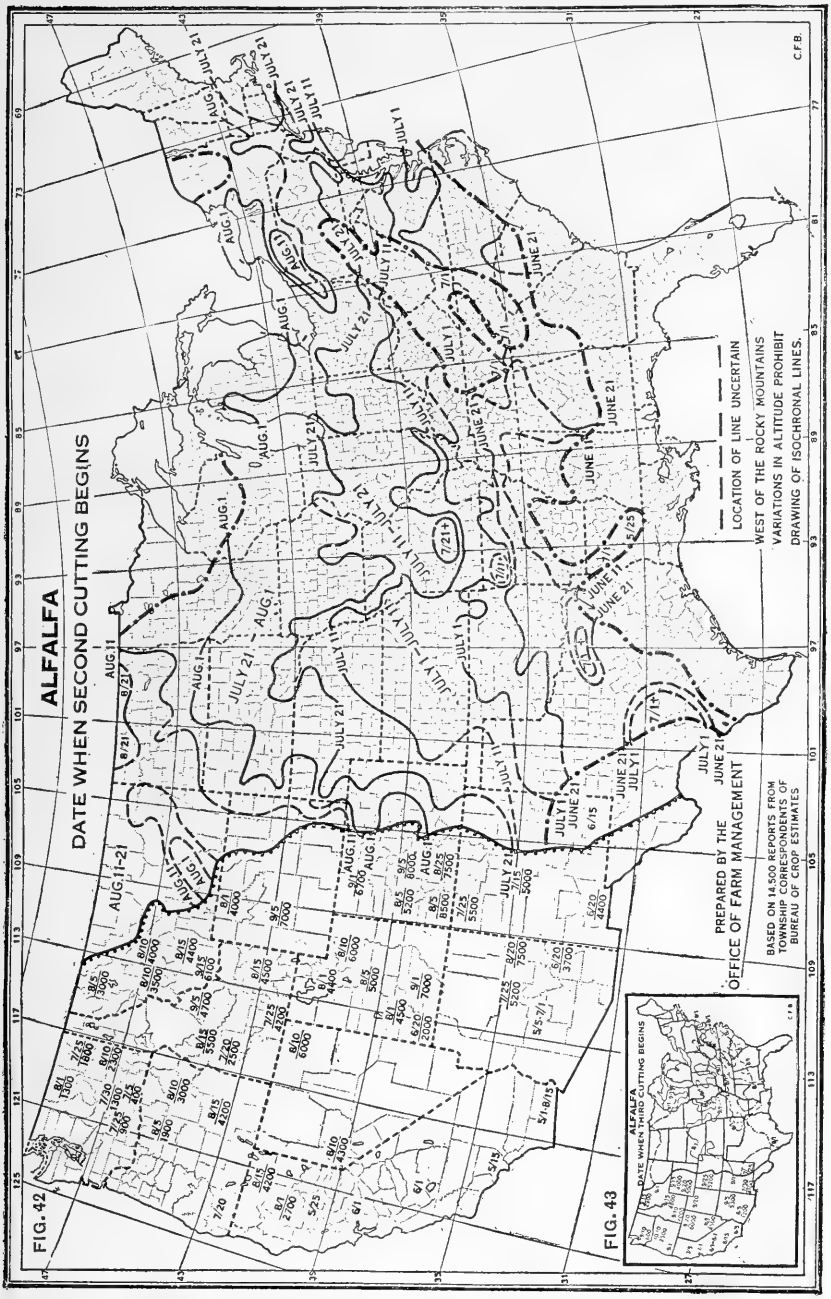


FIG. 41.—Alfalfa is the leading hay crop in the irrigated valleys of the West and in the subhumid section of the central Great Plains region. In the humid parts of the United States where timothy and clover thrive farmers seldom choose to make alfalfa their leading hay crop. The fact that the first cutting interferes more with the cultivation of corn than does the cutting of timothy and clover, has much to do with the small acreage of alfalfa in the humid section of the corn belt. In Kansas and Nebraska the first cutting of alfalfa begins about June 1; in eastern Colorado, the Salt Lake region, and in the Yakima and lower Snake River Valleys about June 10; in the Imperial and Salt River Valleys about April 1; in the Great Valley of California about April 15.



FIGS. 42 and 43.—Throughout practically the entire range of alfalfa in the United States a second cutting is secured. This begins generally about five to seven weeks after the first cutting. In some of the warmer sections of the West it may occur within a month of the first cutting, while in the cooler sections of the North and East nearly two months may elapse. The requirement per acre for the first cutting, raking, and stacking in Kansas is about 8 hours of man and 10 hours of horse labor. For the second cutting the amount is generally somewhat less than for the first, as the crop is usually lighter. A third cutting of alfalfa occurs throughout most of its range, and in California six and even seven cuttings are secured. Reports indicate that the average amount of labor required per acre in Kansas for four cuttings, including raking and stacking, is about 21 hours of man and 27 hours of horse labor; for 6 cuttings in California 40 hours of man labor, including irrigating, and 38 hours of horse labor.

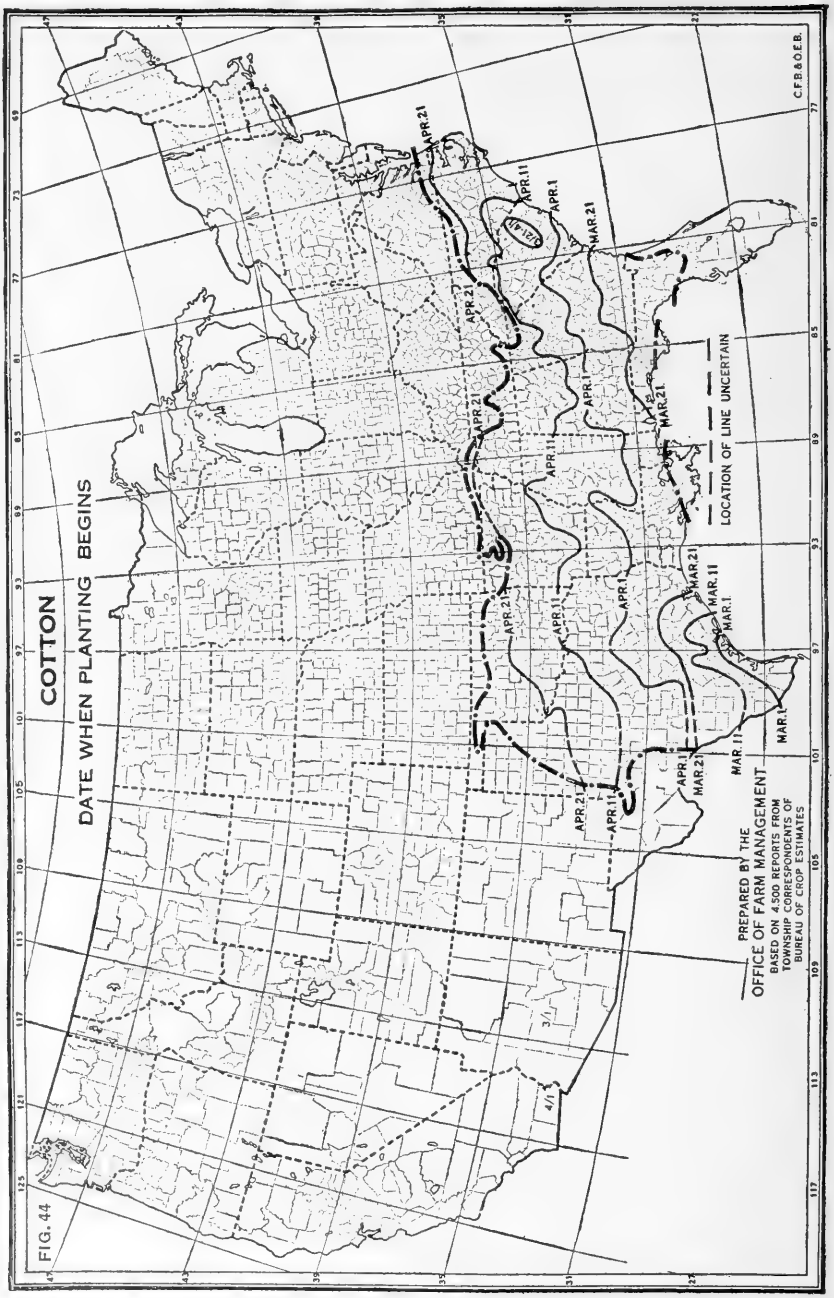
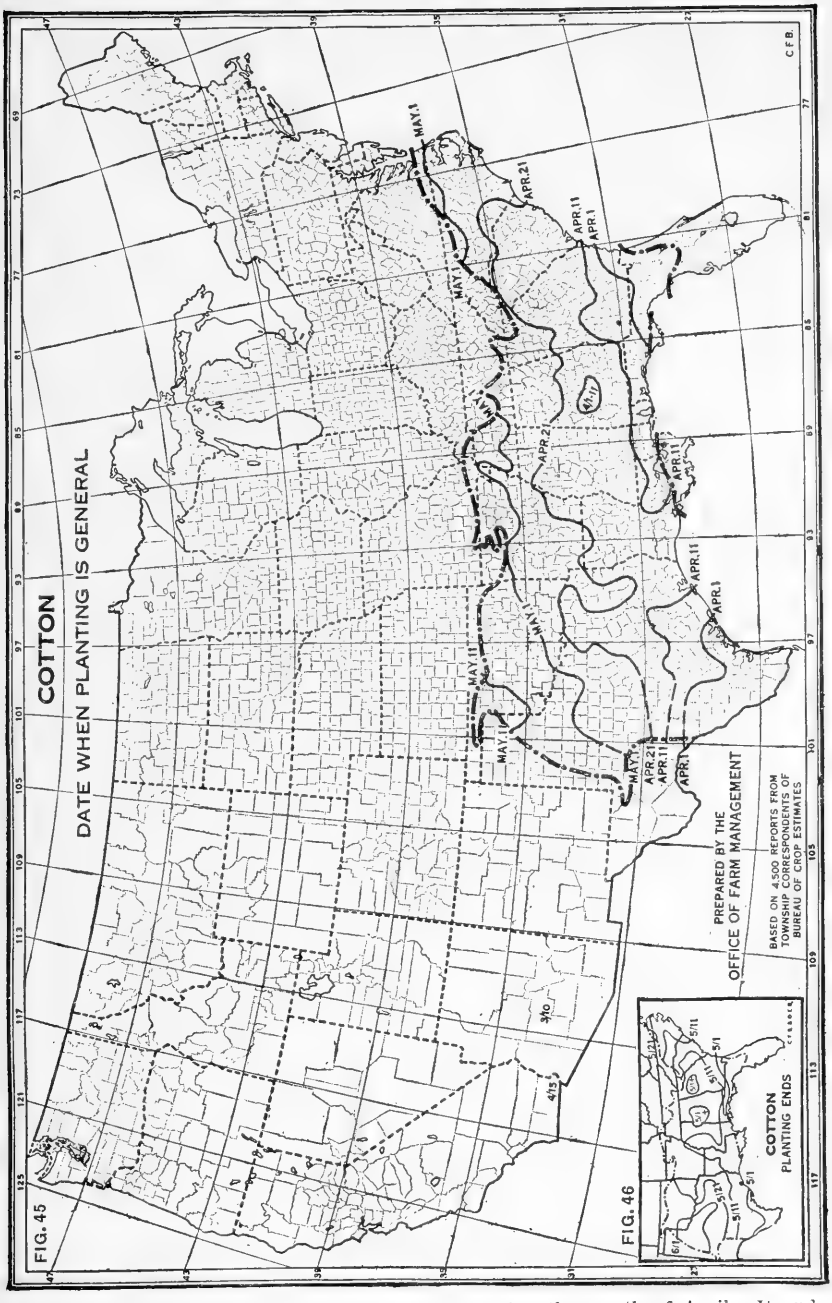
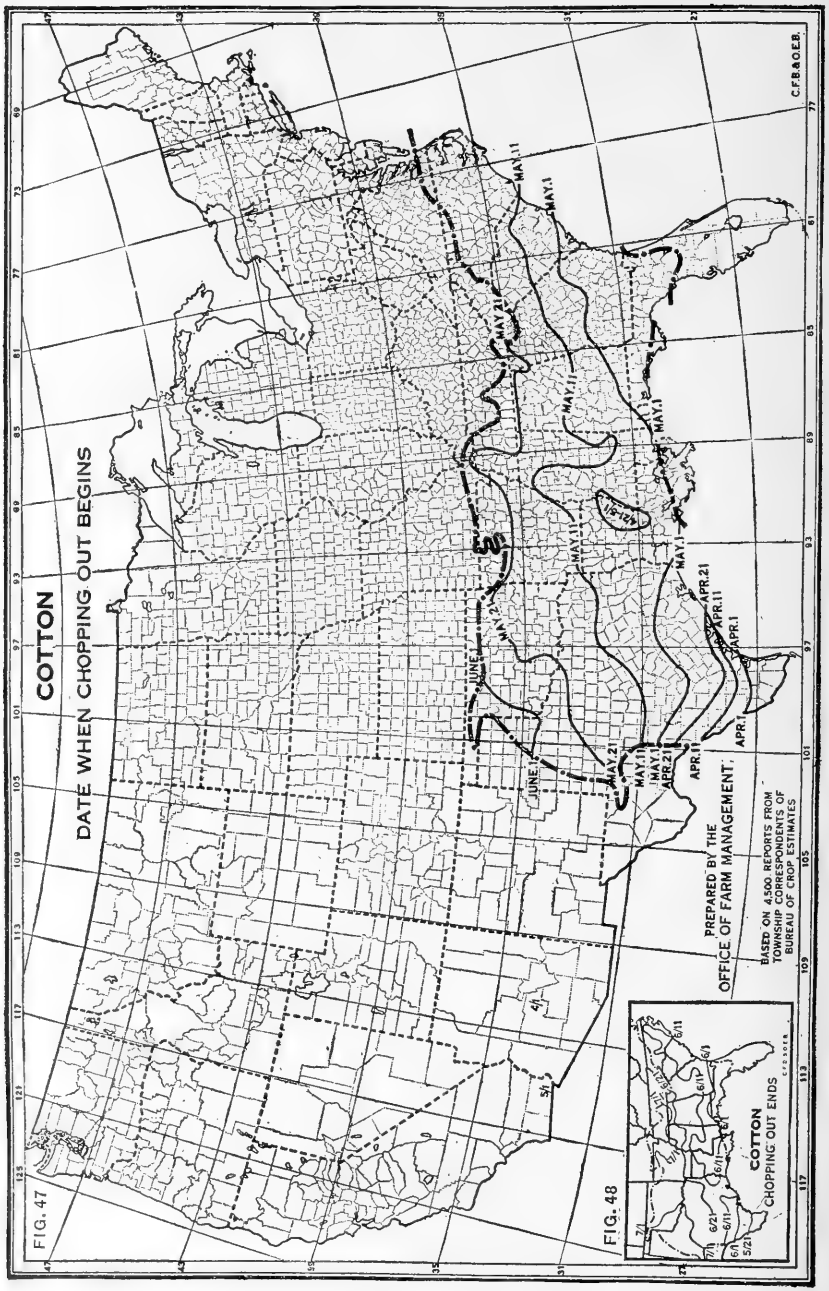


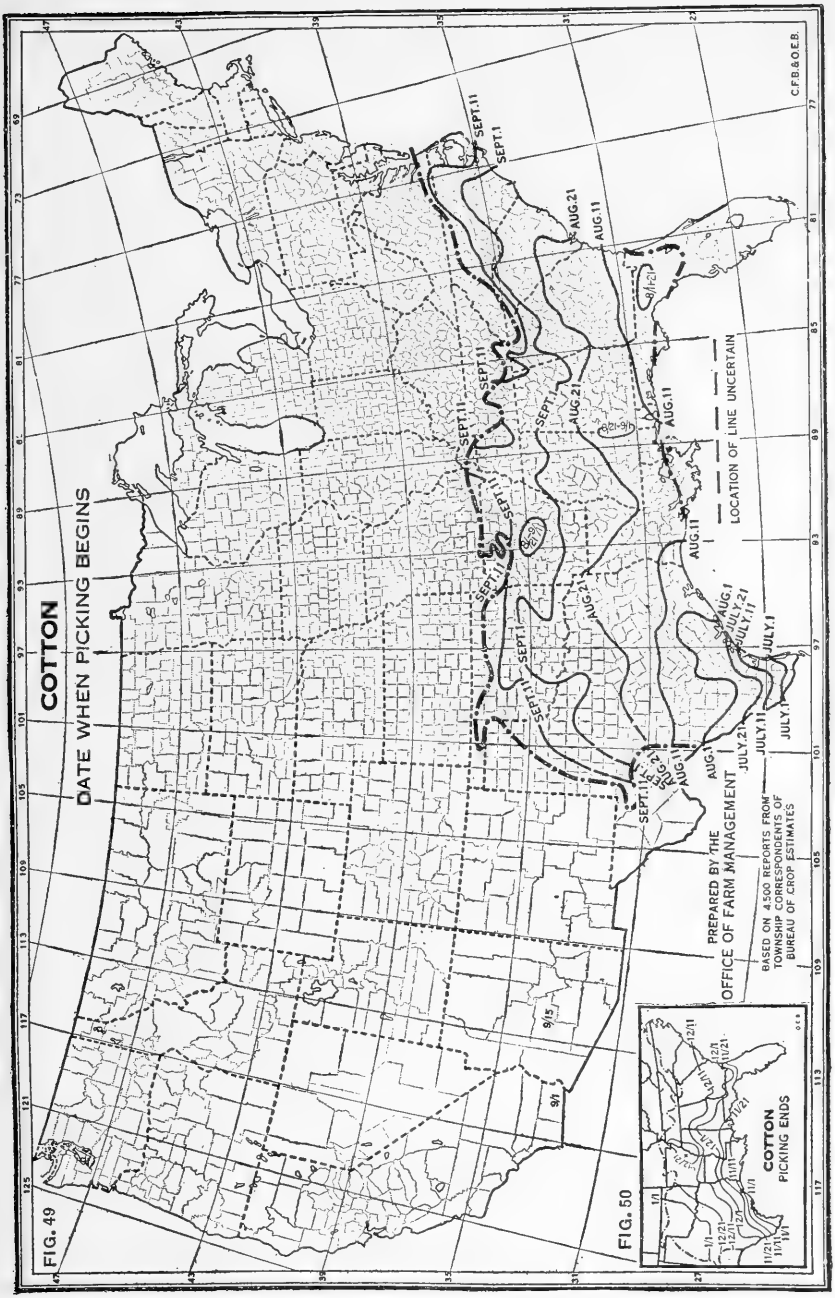
FIG. 44.—Cotton planting begins usually about the middle of March in extreme southern Texas and in northern Florida; about April 1 in the Black Waxy Prairie of Texas, in central Louisiana, central Alabama, and central Georgia; and about April 21 along the northern margin of the cotton belt. Records from the Black Prairie of Texas show that cutting stalks, plowing or bedding, and harrowing require, on the average, about 4 hours of man and 12 hours of horse or mule labor per acre, planting requires about 1 hour of man and 3 hours of horse labor, chopping out 11 hours of man labor, cultivating 7 hours of man and 14 hours of horse labor, picking about 32 hours of man labor, and hauling to the gin 2 hours of man and 3 hours of horse labor per acre, a total of approximately 57 hours of man labor and 32 hours of horse labor per acre.



FIGS. 45 and 46.—Cotton planting is general during the month of April. It ends usually by May 21. Records from nine localities in Georgia, Alabama, Mississippi, Louisiana, and Arkansas show a requirement of 12 to 16 hours of man labor and 13 to 26 (average 20) hours of mule labor to prepare an acre of land for cotton, 2 hours man labor and also of horse labor to plant an acre, 15 to 22 (average 17) hours labor both man and horse to harrow and cultivate, 13 to 30 (average 18) hours man labor only to chop and hoe, and from 45 to 90 hours of man labor per acre to pick the crop. In addition, an average of 4 hours of man labor and 8 hours of mule labor per acre are required to haul the crop to the gin and market. The amount of labor required varies with the method of handling the crop, the character of the soil, and other factors, but in general the production of cotton east of Texas and Oklahoma requires from 100 to 140 hours of man labor and from 45 to 60 hours of mule labor per acre.



FIGS. 47 and 48.—No other staple crop in the United States requires so much hand labor as does cotton. Next to picking, chopping out—that is, thinning the plants to a certain distance apart in the row—is the most laborious process in the production of cotton. This operation begins usually about a month after planting, or about May 1 in the southern portion of the cotton belt and May 21 along the northern margin, and ends four or five weeks later. Chopping out is done entirely by hand and requires in general from 13 to 25 hours of labor per acre in the eastern portion of the cotton belt, 18 hours being, perhaps, a fair average. In the Texas Black Waxy Prairie the reports indicate that only about 11 hours are required, on the average, for chopping out an acre of cotton.



FIGS. 49 and 50.—The picking of cotton begins along the southern margin of the cotton belt from South Central Texas eastward about August 11. By August 21 in the normal year picking has begun in the Black Prairie of Texas, in central Alabama, and throughout the Coastal Plain of Georgia, and by September 11 it has begun along the northern margin of the cotton belt. Picking continues throughout the fall, not being finished usually until December. The corner map showing the dates when picking ends is highly generalized, for on different farms in the same county the end of picking may be any time within a period of three months. In general, it is figured that a negro "hand" can pick 150 pounds of lint cotton in a day, so that the amount of time varies with the yield from 30 to 100 hours per acre. The average time required to pick an acre of cotton east of Texas is 50 hours, a greater amount of man labor than is required to produce 3 acres of corn in Illinois or 4 acres of wheat in Kansas.

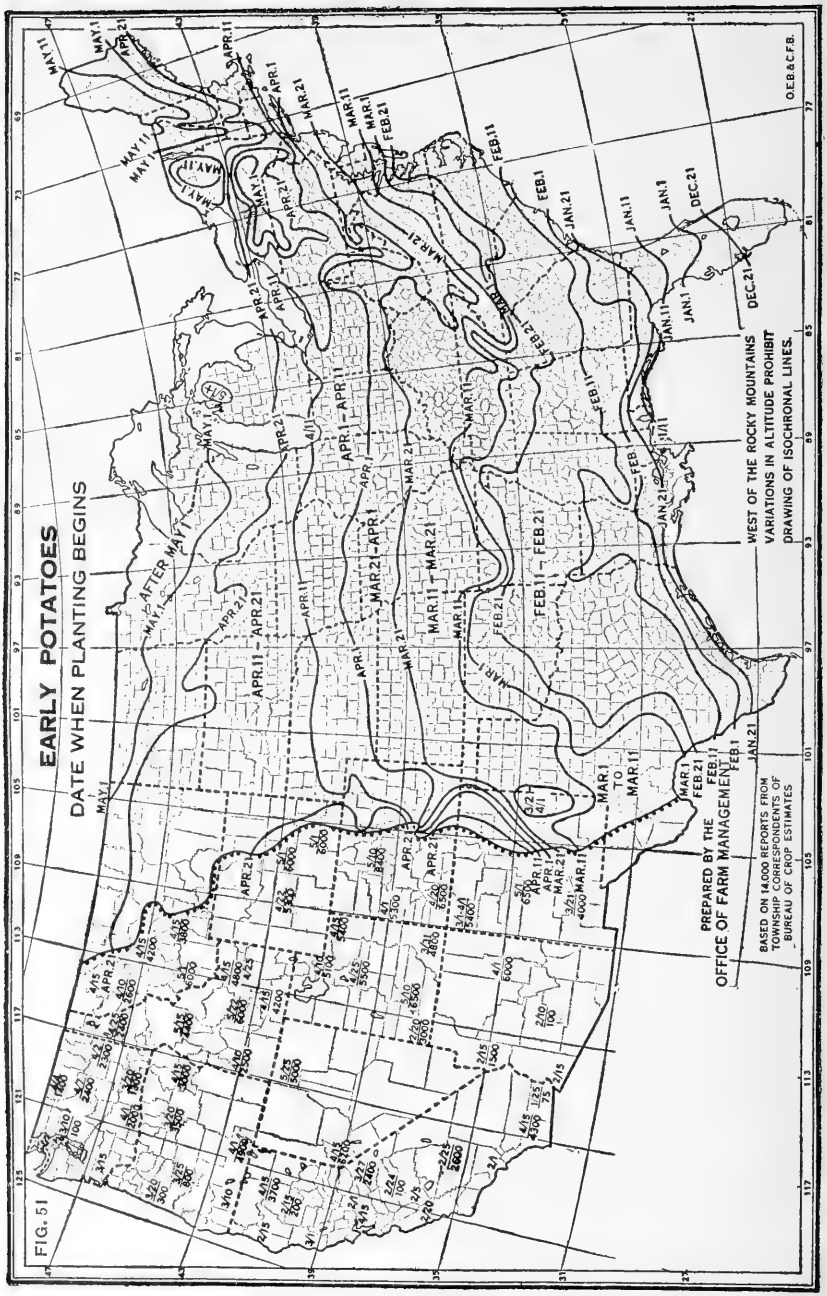
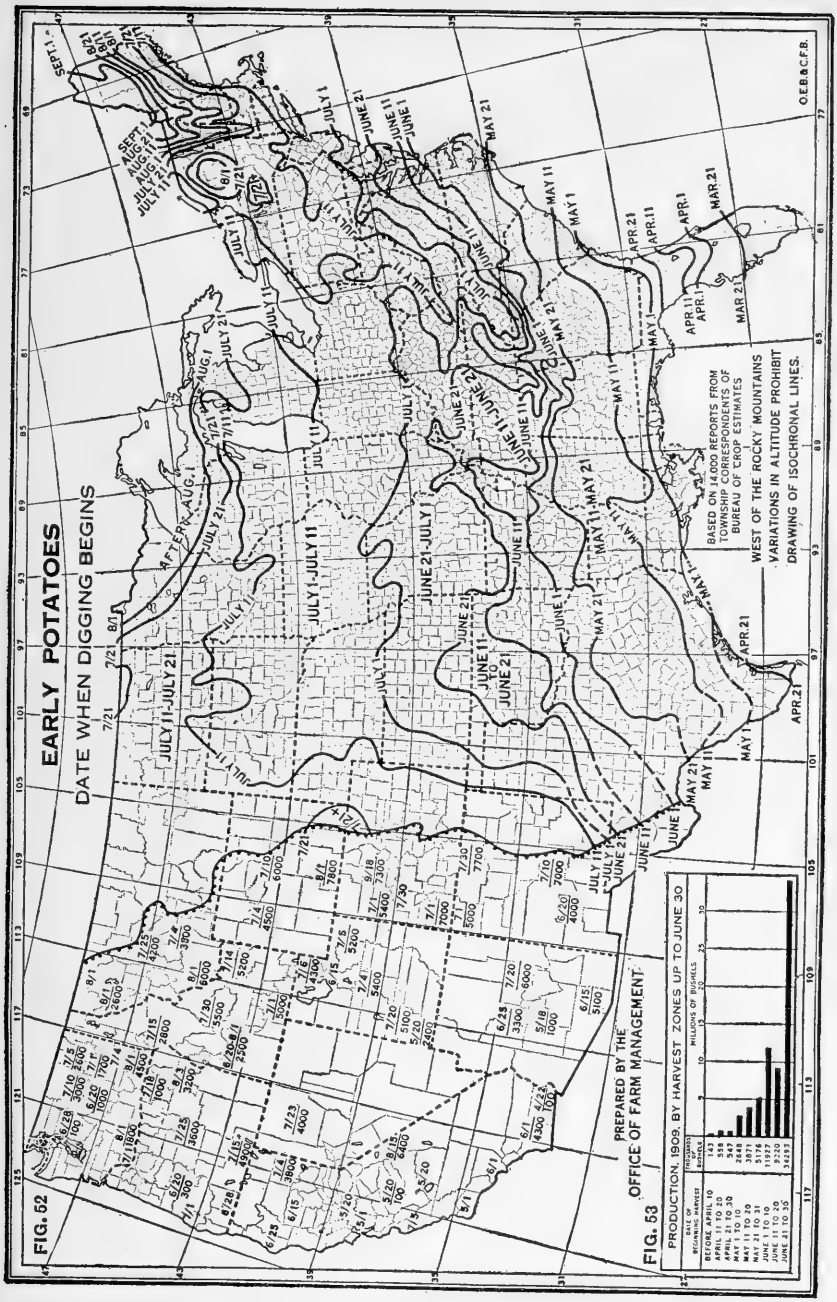


FIG. 51.—Early potatoes constitute but a small part of the potato crop of the United States, and their commercial production is developed principally in the South Atlantic and Gulf States, whence they are shipped, both by rail and boat, to the northern cities. The planting of early potatoes begins in southern Florida in November or December and lasts for two months or more, in central Florida planting begins about February 20, around Charleston February 1, in the Norfolk district March 1, and in the district around New York City about April 1. Early potatoes are not a commercial crop north of New York City, but a few are planted for home use. In northern Maine and northern Minnesota this planting begins about May 11, and practically coincides with the planting of the late potato crop, which is the commercial crop in the Northern States. This map also shows, perhaps better than a temperature map, the progress of the season northward in the United States.



FIGS. 52 and 53.—The digging of early potatoes begins in southern Florida from January to March, in the Hastings, Fla., district usually about April 11, and by May 1 has reached Charleston, S. C. It is in progress in the Norfolk, Va., district usually by June 1, and begins on Long Island about July 1. Since Charleston is located nearer the northern markets and has cheaper transportation rates than Hastings, when shipments begin from Charleston those from Hastings dwindle rapidly, and likewise when the Norfolk shipments begin the Charleston season soon ends. On Long Island, if prices are high, the crop is dug during July and sold as early potatoes, but if prices are low the potatoes are not dug until fall. The average amount of labor required to produce an acre of early potatoes in the Hastings, Fla., district is about 115 hours of man labor and 66 hours of horse labor. Of this amount 79 hours of man labor and 12 hours of horse labor per acre, according to the records, were required in digging.

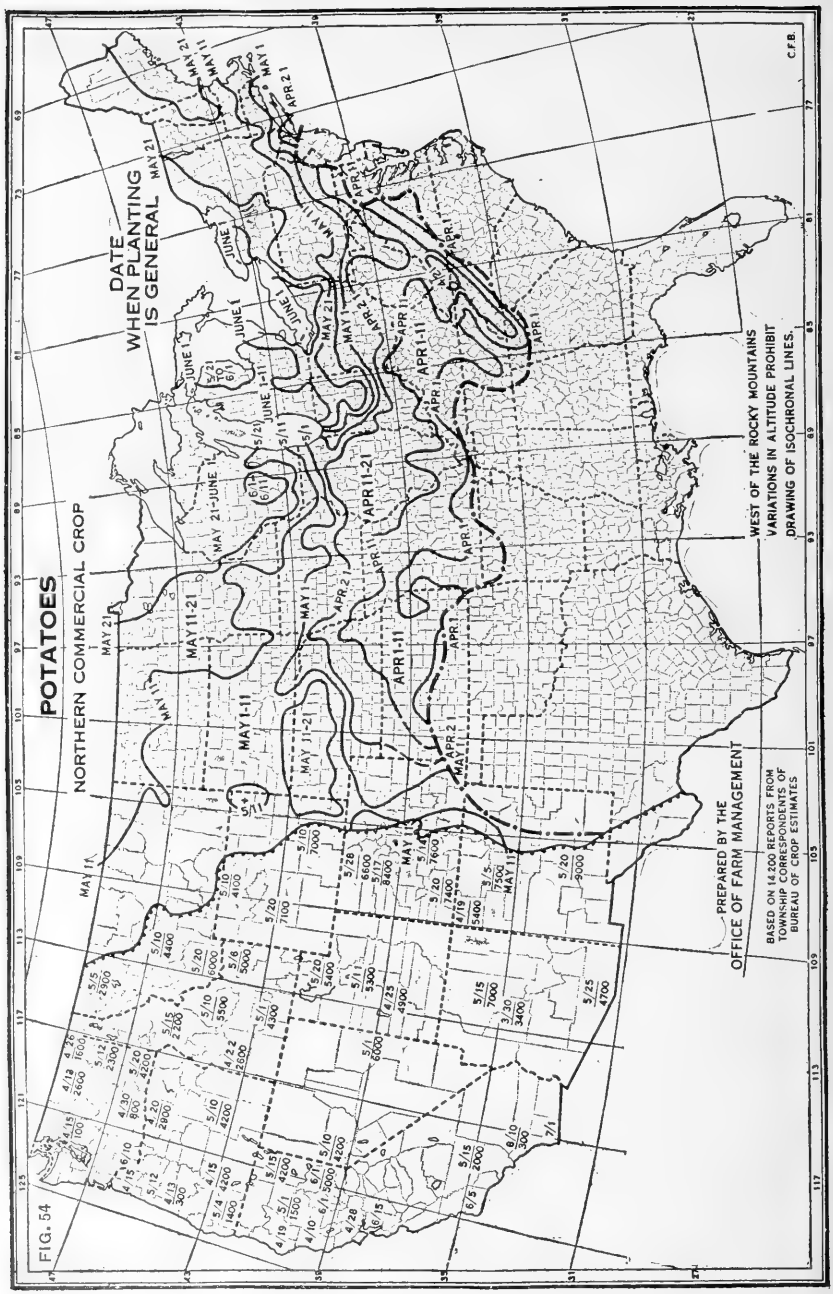
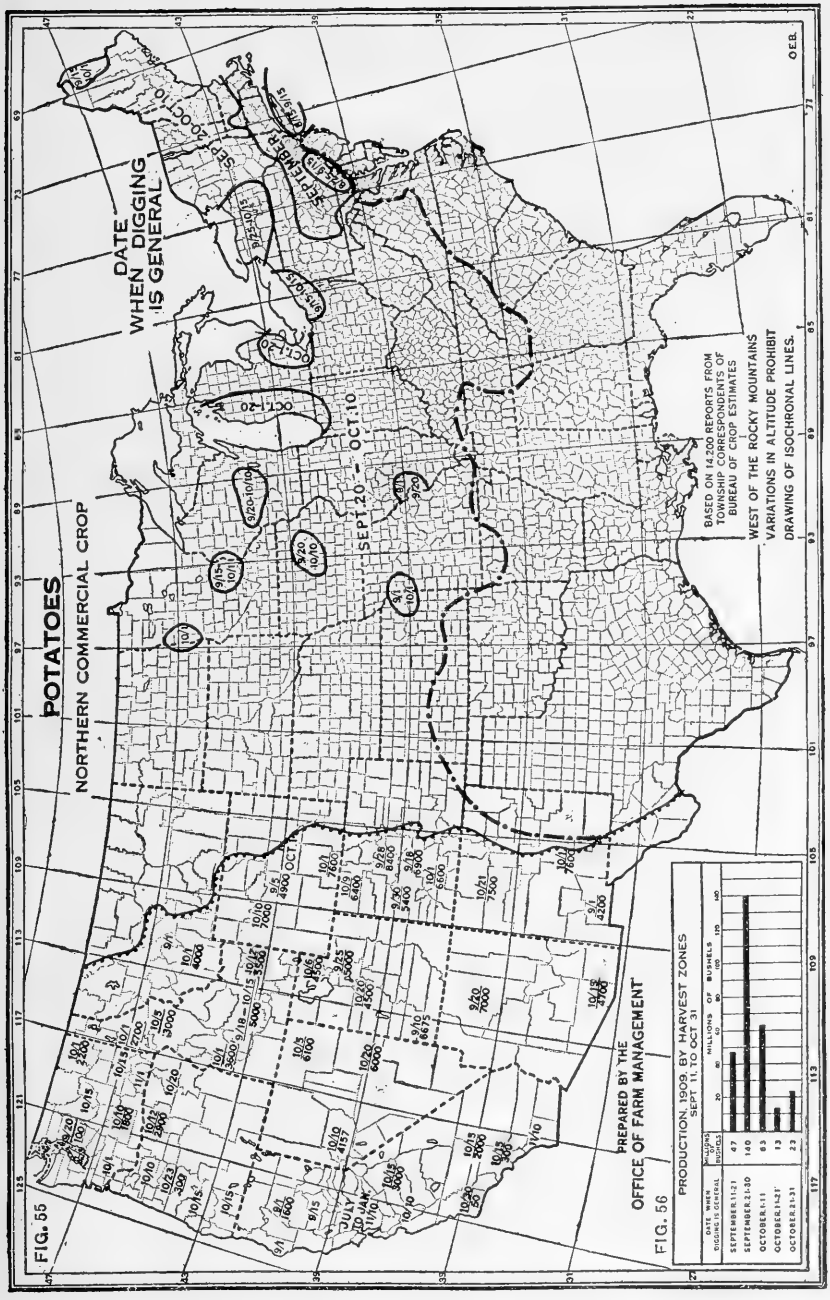
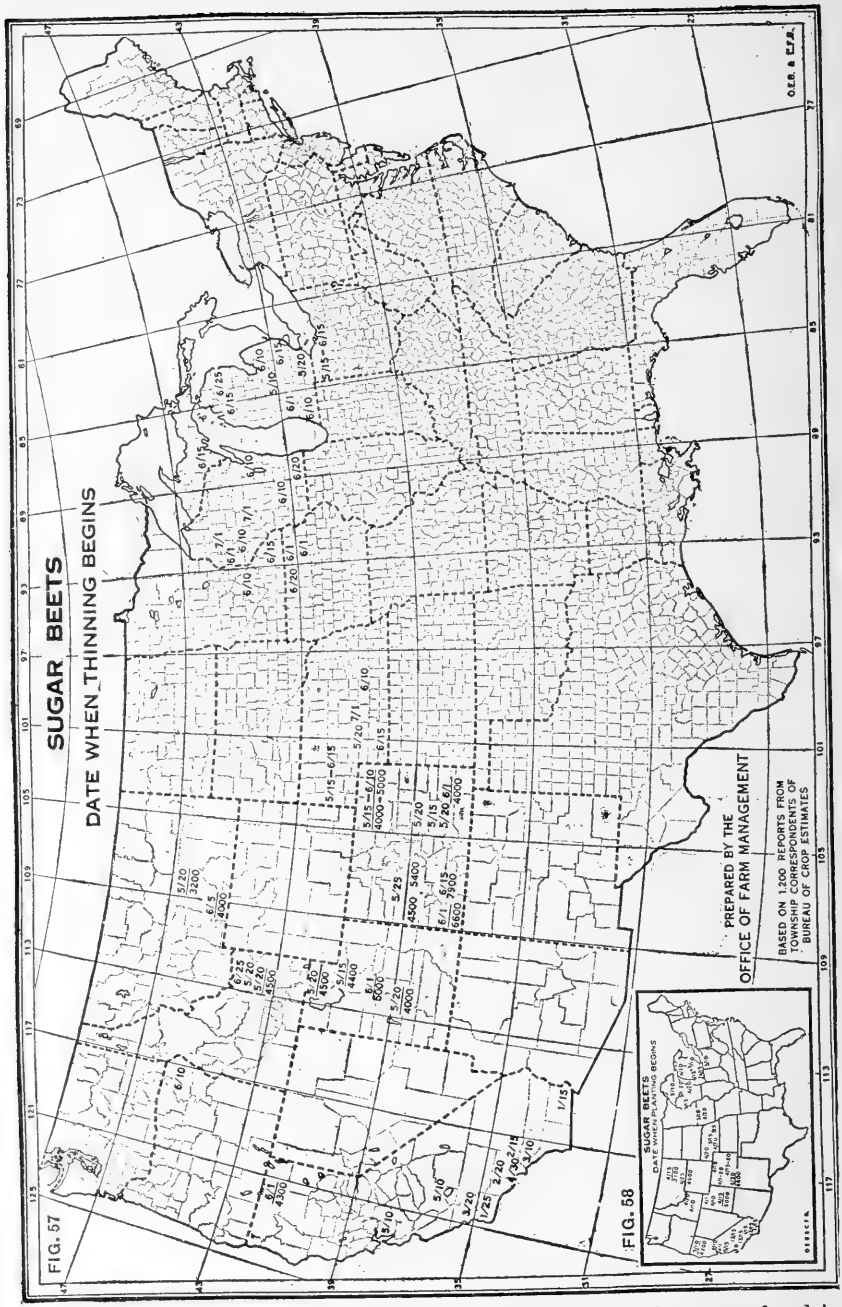


FIG. 54.—The late potato crop constitutes probably 95 per cent of the total potato production of the United States. In practically all the large producing centers, except those in California, this crop is planted between April 1 and June 11. In Aroostook County, Me., planting is general usually about May 15, in western New York May 21 to June 1, in Michigan and central Wisconsin June 1 to 11, in the Minnesota and Colorado districts about May 15, but in the Stockton, Calif., district planting extends from March until July 1, while digging takes place from June 1 until February 15. In this region there is little seasonal change in temperature and the dates of planting and digging depend more on the market price than upon weather conditions. In the Maine, New York, Michigan, Wisconsin, and Minnesota districts, on the other hand, the necessity of digging the crop before the ground freezes limits to a period of a few weeks not only the digging but also the planting of potatoes.



FIGS. 55 and 56.—The digging of late potatoes in all the large producing districts, except those in California, occurs usually between September 15 and October 11. The earliest digging generally occurs around the large cities. Owing to the moderate autumn temperature along the Lake shores in Michigan and New York digging may be delayed as late as the latter half of October. In the Wisconsin district several records indicate that plowing and preparing the ground for potatoes requires about 9 hours of man labor and 20 hours of horse labor, planting 8 hours of man and 2 hours of horse labor, cultivating, spraying, and hoeing 17 man and 11 horse hours, harvesting 35 man and 13 horse hours, while there were spent in marketing and miscellaneous work on the crop an average of 19 man and 34 horse hours—a total of 88 hours of man and 80 of horse labor per acre. Practically all this work in the northern States is done by the farmers with the help during digging time of labor secured from near-by villages.



FIGS. 57 and 58.—The chief sugar-beet districts of the United States are found in California, Colorado, Utah, Idaho, Michigan, and Wisconsin. In the Michigan and Wisconsin districts, and in adjacent States, sugar beets are cultivated under humid conditions, while in Colorado, Utah, Idaho, and other Western States this crop is produced under irrigation. In California sugar beets are grown both with and without irrigation. There is a wide range in the dates when the operations on sugar beets are performed. Planting may begin in California as early as October and may continue as late as the following May. In the irrigated districts of Colorado, Utah, and Idaho planting varies from the first of April till the middle of June. The bulk of the planting is done in this section from April 25 to May 20. This is true also of Michigan and Wisconsin. Thinning begins from three to four weeks after planting.

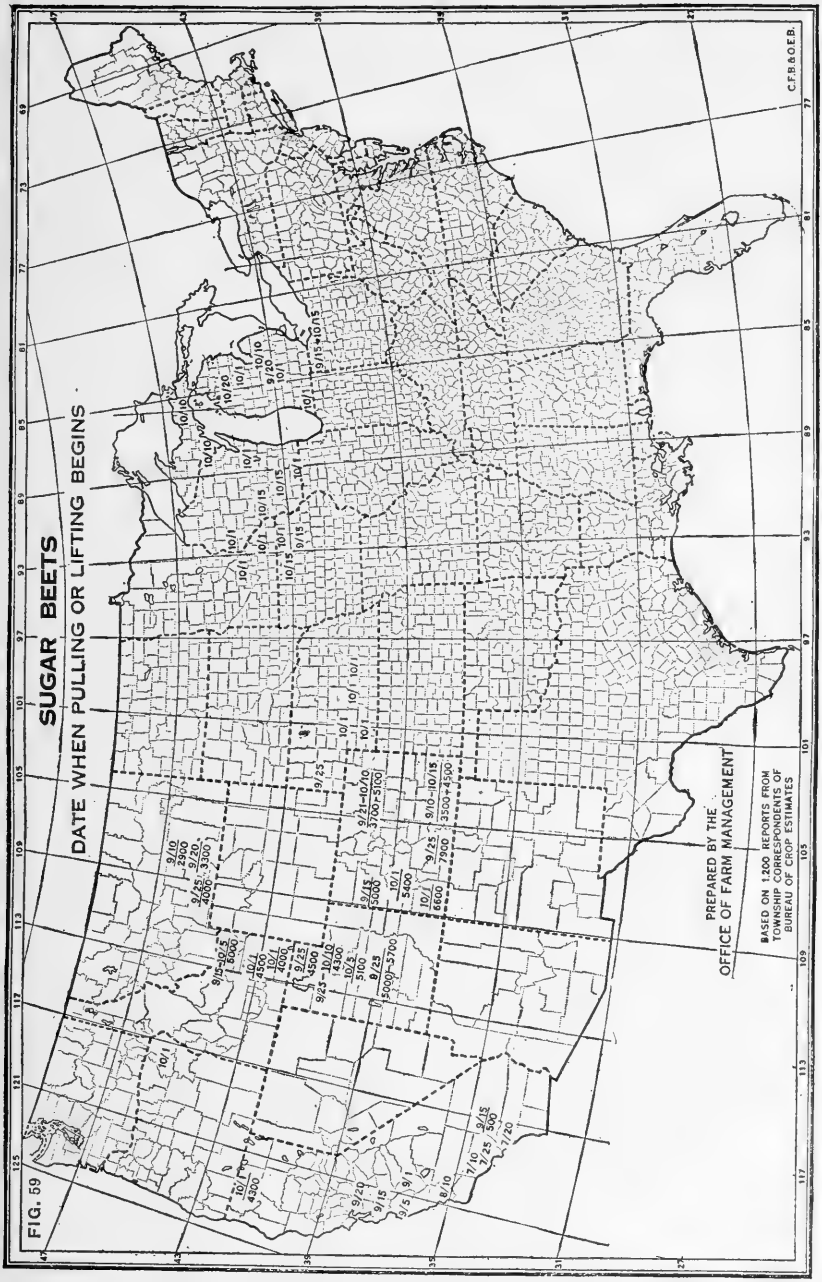
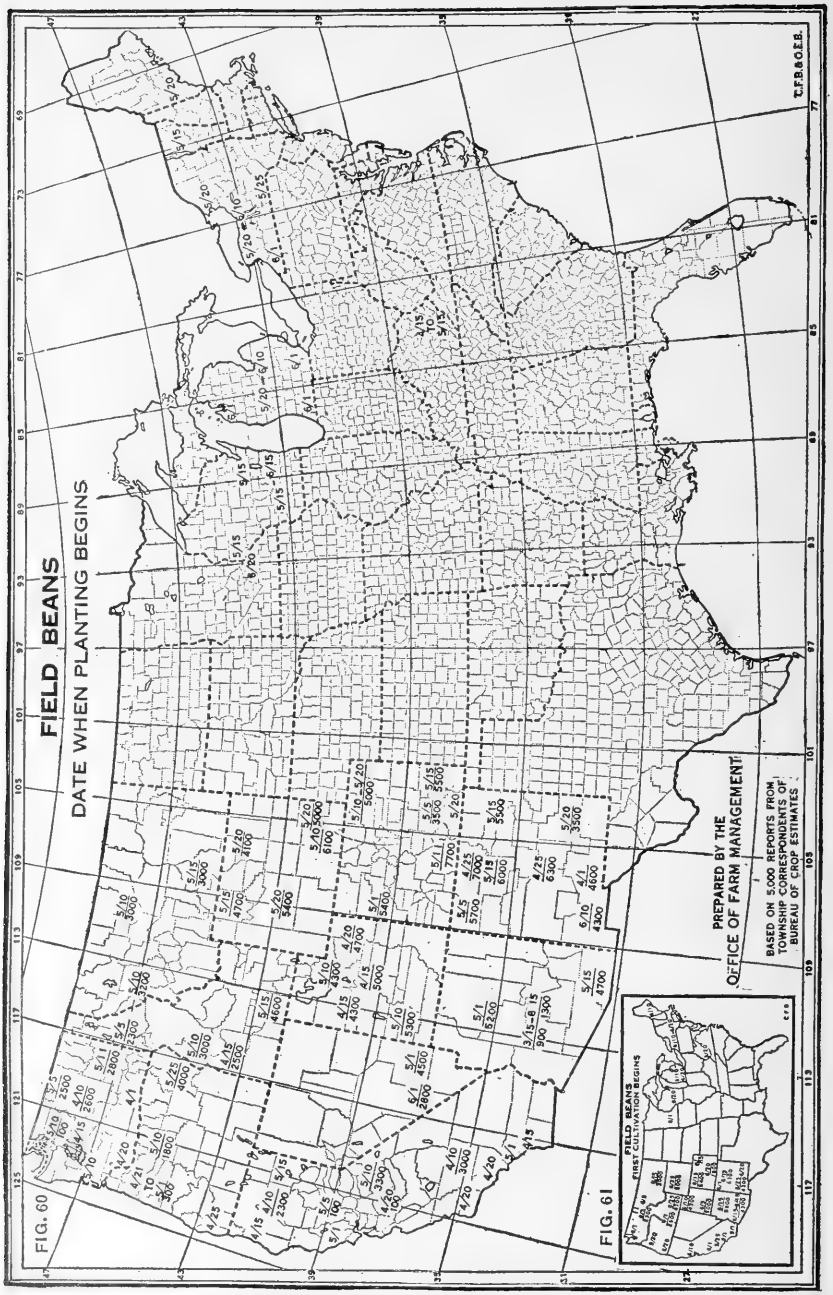


FIG. 59.—Pulling, or "lifting" sugar beets begins in southern California from the 10th to the 20th of July, and in the Santa Maria and Salinas valleys in August. It begins in late September or the first 10 days in October in Utah, Idaho, Colorado, and other western mountain districts. In Michigan and Ohio the dates are approximately the same. The labor engaged to do the blocking and thinning also performs usually this final hand operation of pulling and topping. The sugar companies usually make the necessary arrangements for bringing this labor into the district where it is needed. In the Middle West laborers for the thinning are obtained from large cities. A fair proportion of the hand work in southern Colorado and also in southern California is done by Mexican labor. Farther north in California, also in northern Utah and suthern Idaho, much of the hand work is done by Japanese. According to reports from the Greeley district in Colorado sugar beets require a total of about 120 man hours and 100 horse hours per acre. About three-fifths of the man labor was contracted.



FIGS. 60 and 61.—The chief centers of production of dry edible beans are New York, Michigan, and California. The acreage devoted to beans also has been expanding in New Mexico, Colorado, Washington, and Idaho during the past two years. The Michigan and New York growers have confined their attention largely to the production of navy beans and kidney beans. In Colorado and New Mexico the pinto or Mexican bean is grown to the exclusion of practically all other varieties. There are two distinct districts in California; one, located along the southern coast, produces lima beans exclusively, while in the other area, which includes the valleys and coast of central California, pinks, Lady Washington, and navy beans are grown. The planting or seeding period in the lima bean district varies from April 15 to May 1. In the other district the planting begins between the 20th of April and the 1st of May. In New York, Michigan, and Wisconsin bean planting begins from May 15 to June 10, usually after corn planting.

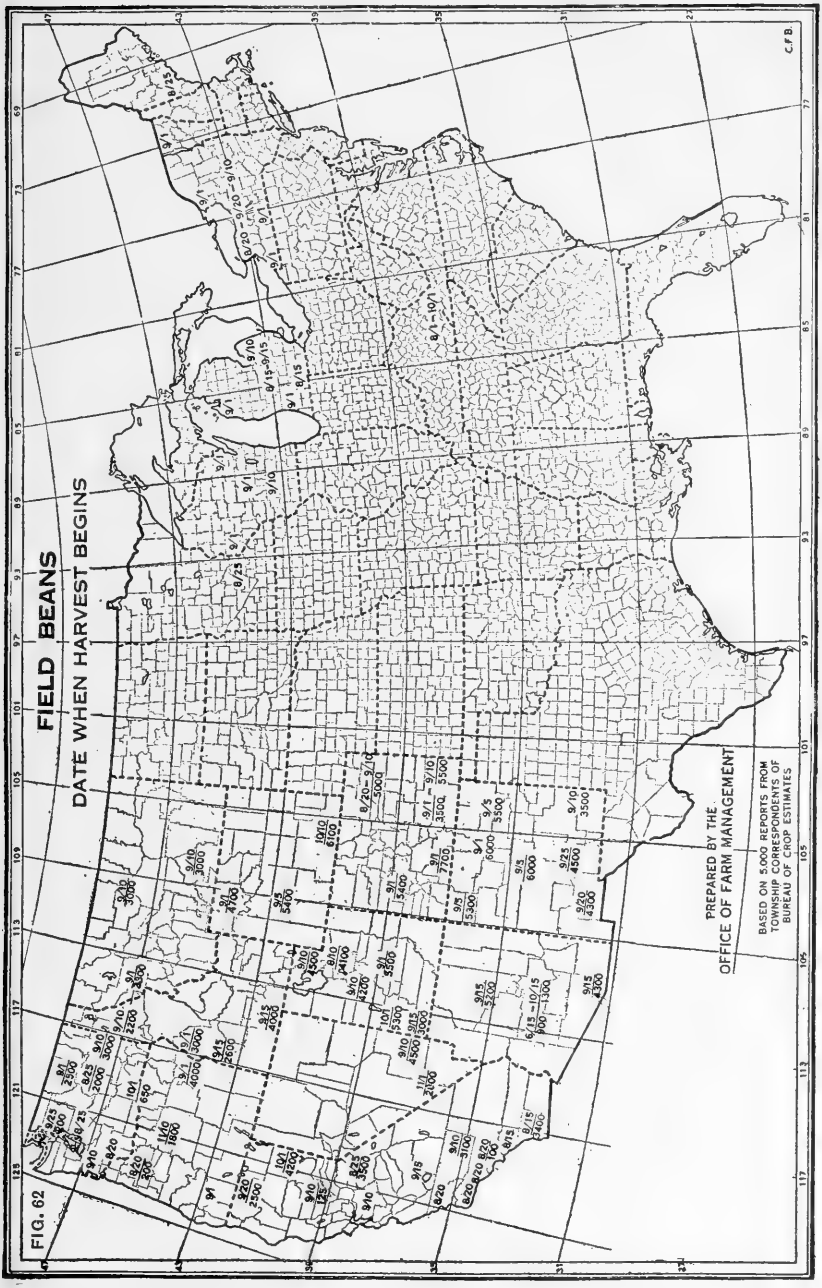
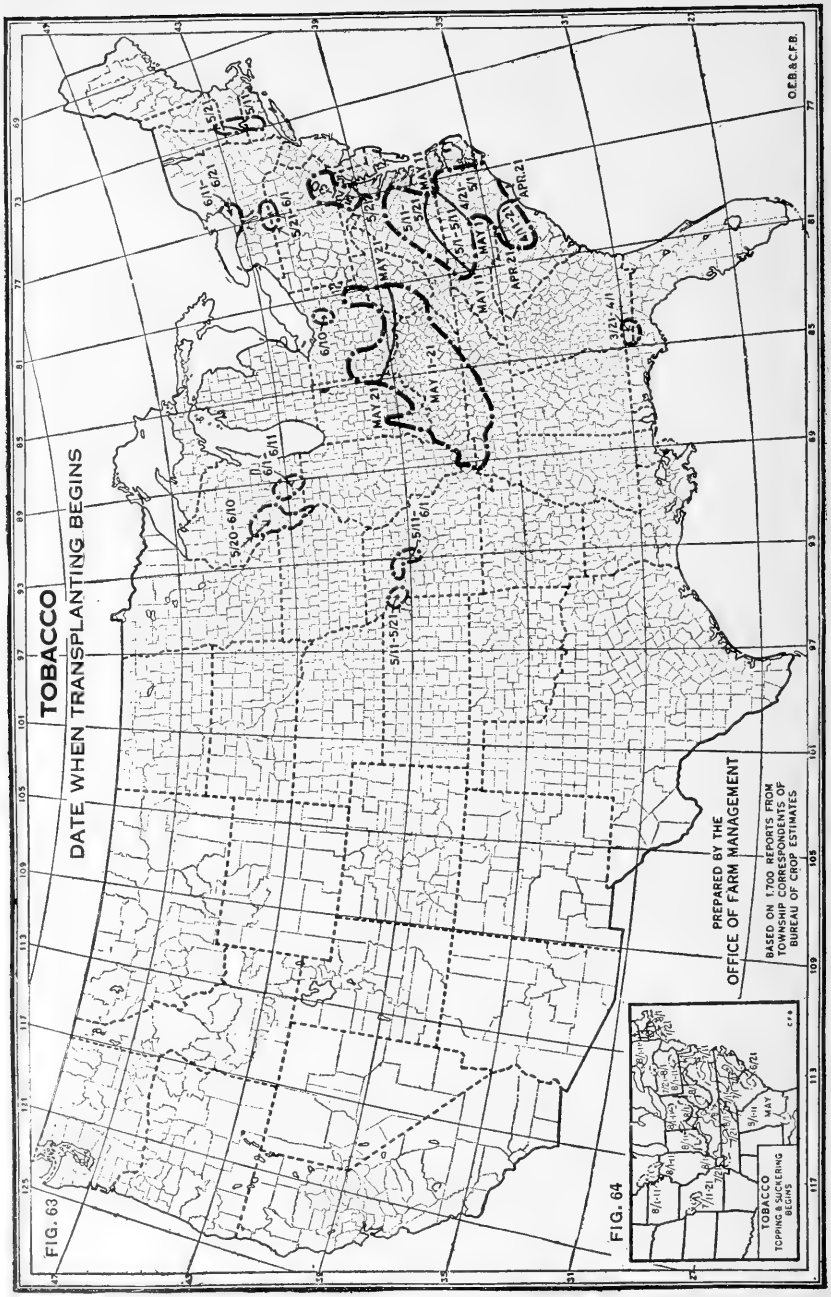
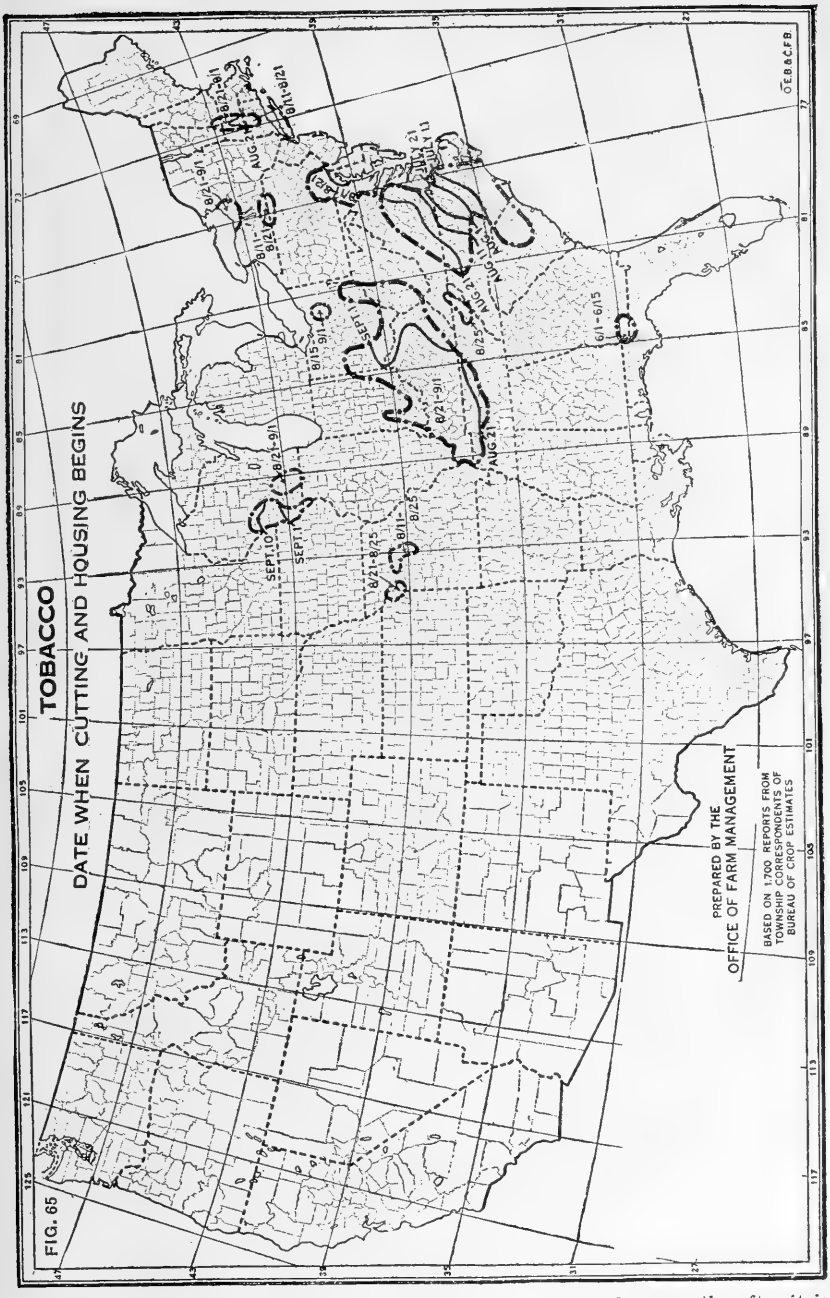


FIG. 62.—In the lima bean district of southern California the beginning of bean harvest varies from August 15 to September 15. The beginning of harvest for those counties that produce pinks, Lady Washington, and navy beans also varies from August 15 to September 15. The Colorado bean harvest begins the latter part of August or early in September. In the plains area this work does not conflict appreciably with other farm operations, but in the irrigated districts the completion of the bean harvest may interfere to some extent with potato digging or in some cases with beet lifting. Michigan and New York bean growers begin harvesting from August 20 to September 20, the most common date being September 1. In the bean-growing counties of Michigan the crop is usually out of the way by the beginning of sugar-beet harvest. Beans and potatoes compete for labor at this season of the year in some New York districts. Corn harvest or silo filling may also demand attention at this time.



FIGS. 63 and 64.—Plug and export tobacco (burley and heavy dark tobacco) are grown mainly on the heavy clay soils of the Ohio River valley. Tobacco for cigar wrappers, binders, and fillers is grown in scattered localities from western Florida to New England and Wisconsin, mainly, however, in the Connecticut valley of New England. Smoking and chewing tobacco is extensively grown in the Piedmont and coast regions of Virginia and the Carolinas, mostly on sandy loam soils. Tobacco is sown in beds early in the spring and later transplanted. In the more southern districts these beds are prepared from about February 1 to March 15, and in the more northern districts from about March 15 to April 1. Transplanting in Florida begins about the 21st of March and in the most northern localities in New York and Wisconsin it begins as late as June 10. In the central districts, where the bulk of the tobacco is grown, the transplanting begins about May 10 and continues up to about June 1.


TOBACCO
DATE WHEN CUTTING AND HOUSING BEGINS
PREPARED BY THE
OFFICE OF FARM MANAGEMENT
BASED ON 1,700 REPORTS FROM TOWNSHIP CORRESPONDENTS OF BUREAU OF CROP ESTIMATES
AUG. 1-10
8/21-9/1
8/11-8/21
8/1-8/11
AUG. 21-31
AUG. 11-21
AUG. 1-11
8/21-9/1
8/11-8/21
8/1-8/11
7/21-8/1
7/11-7/21
7/1-7/11
6/21-7/1
6/11-6/21
6/1-6/11
8/15-31
8/1-15
7/15-31
7/1-15
6/15-30
6/1-15
SEPT. 1-10
8/21-9/1
8/11-8/21
8/1-8/11
7/21-8/1
7/11-7/21
7/1-7/11
6/21-7/1
6/11-6/21
6/1-6/11
8/21-31
8/11-21
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7/21-8/1
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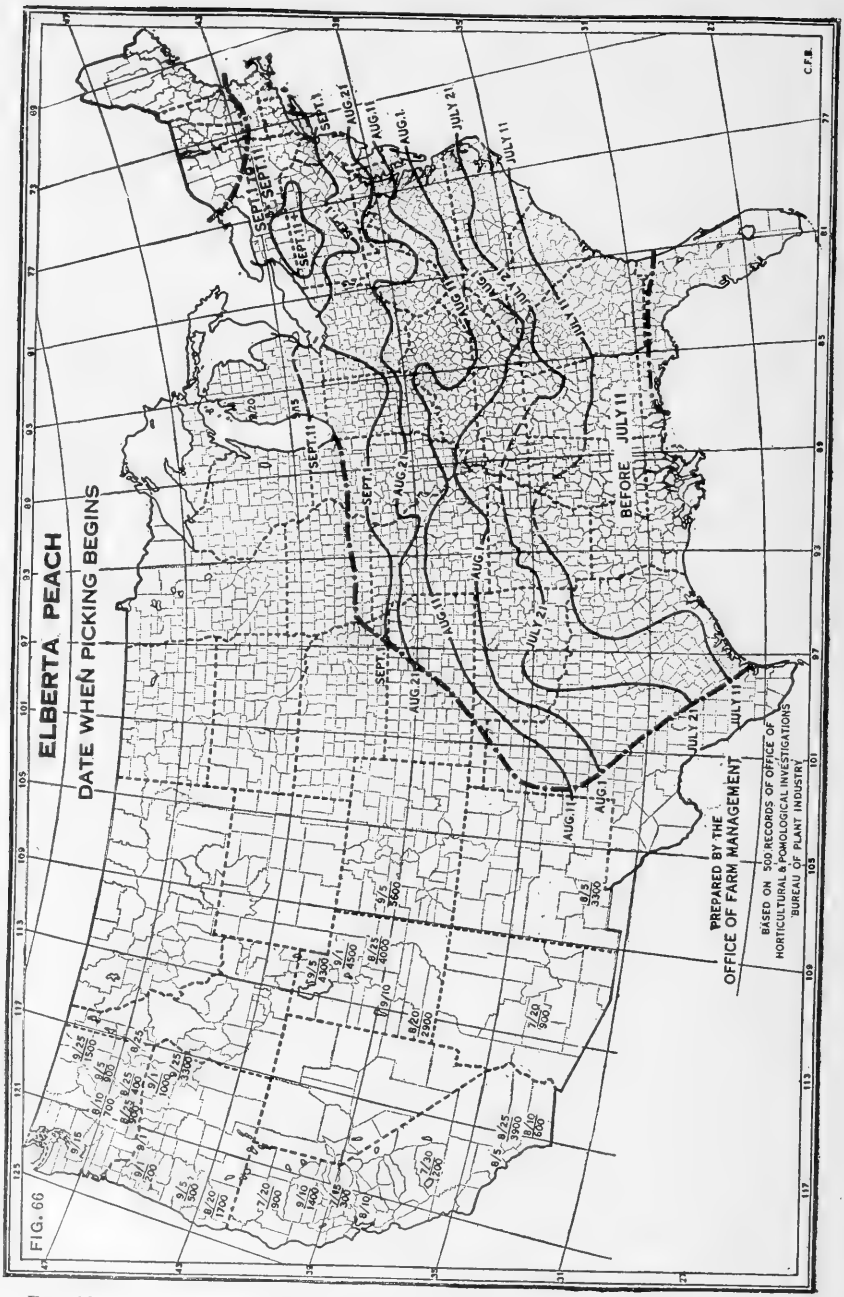

FIG. 66.—Picking the commercial crop of peaches begins in the important centers of central Georgia and northeastern Texas usually about July 10 and is over by the 20th, in the Ozarks picking begins between July 25 and August 15, in Delaware by mid-August, and in Michigan and New York from September 1 to 20. The picking season in these regions is usually about 10 to 15 days long. In California picking begins some years as early as July 15, but usually during August. Picking peaches commonly requires a considerable supply of transient labor. An average crop in central Georgia, 125 bushel crates per acre, requires about 50 hours of man labor; and a crop of 135 crates (or 270 baskets) in West Virginia requires about 45 hours of labor per acre. The map is based on about 500 records from commercial growers received during the 10 years 1902–1911 by H. P. Gould, of the Office of Horticultural and Pomological Investigations, Bureau of Plant Industry.

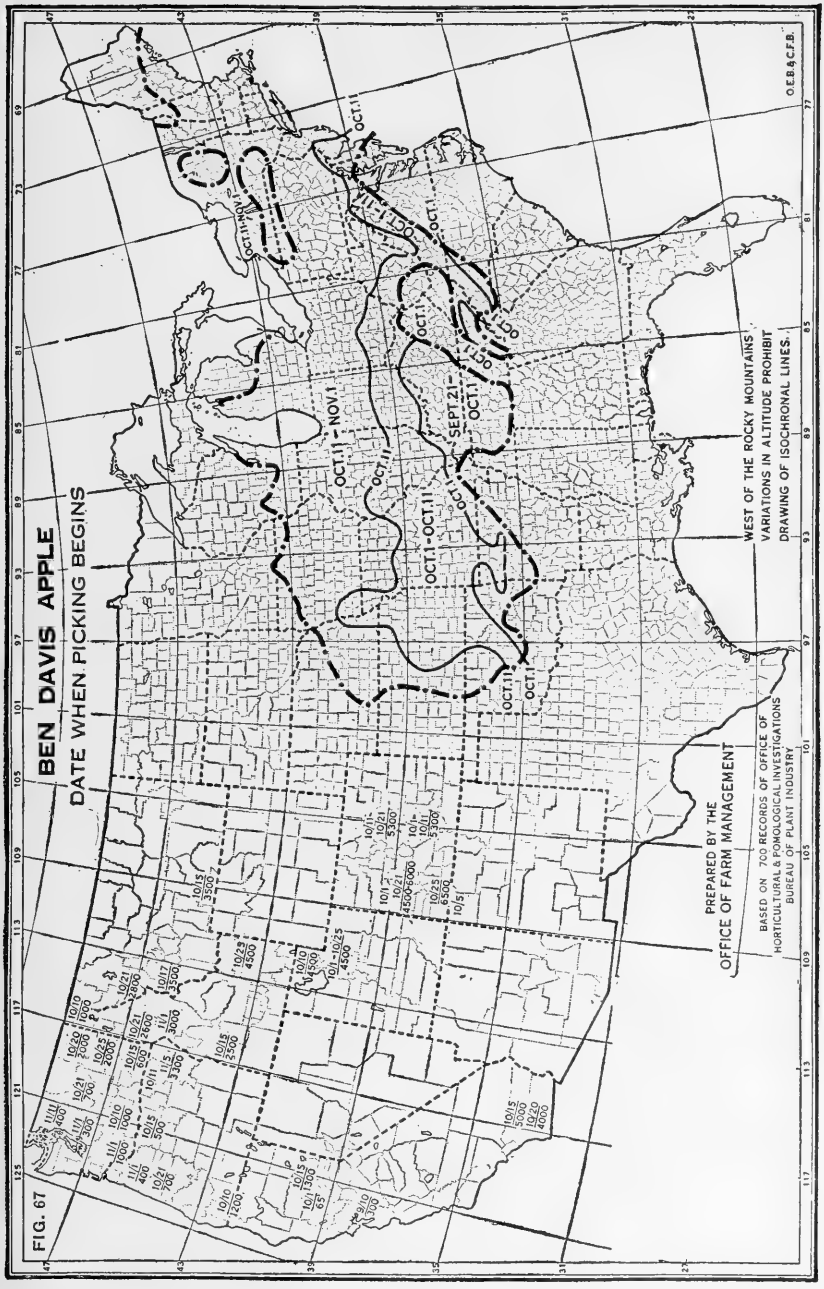

FIG. 67.—The Ben Davis apple is one of the most important commercial varieties and has a wide range. The date of its picking may, therefore, be considered representative of the date when extra labor is needed in handling the winter apple crop. Picking begins about September 21 along the southern margin of the apple belt and progresses northward until about a month later it is beginning in Michigan and New York. In large centers of apple production, especially in Missouri, Michigan, and New York, a considerable amount of transient labor is required to assist in this operation. In general for an 80-barrel crop in New York about 50 hours of labor are required for picking and 50 for sorting, packing, and hauling; and in Hood River, Oreg., 50 hours for picking and 100 for sorting, packing, and hauling a crop of 200 packed boxes per acre. The map is based on about 700 records from commercial growers received during the 10 years 1902–1911 by H. P. Gould, of the Office of Horticultural and Pomological Investigations, Bureau of Plant Industry.

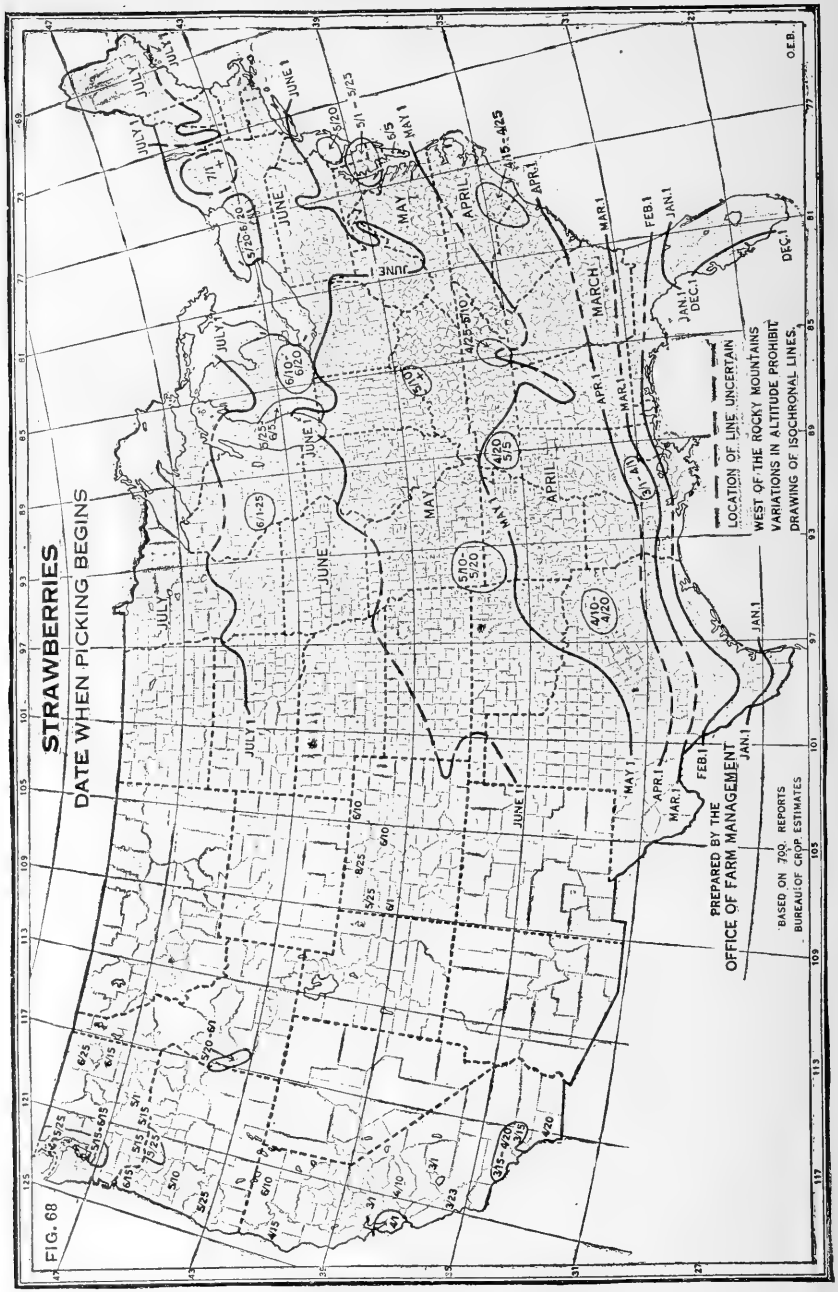

FIG. 68.—The principal centers of commercial strawberry production are shown on the map surrounded by circular lines, and dates are given inside each circle showing when picking usually begins in that district. The irregular lines extending from the Atlantic coast to the Great Plains mark off the zones when picking begins, according to reports from scattered growers outside the important strawberry centers. Lines are drawn only for the first of each month, as the dates are too variable to justify drawing lines for 10-day periods. Throughout most of Florida and along the Texas coast picking occurs during January and February. In southern Georgia and Mississippi picking begins about March 1, in the Carolina district about April 1, in the eastern Maryland and Delaware and Ozark districts early in May, and in western Michigan and New York about June 1. The map is based upon data collected from commercial growers by F. J. Blair, of the Bureau of Crop Estimates, and loaned to the Office of Farm Management.

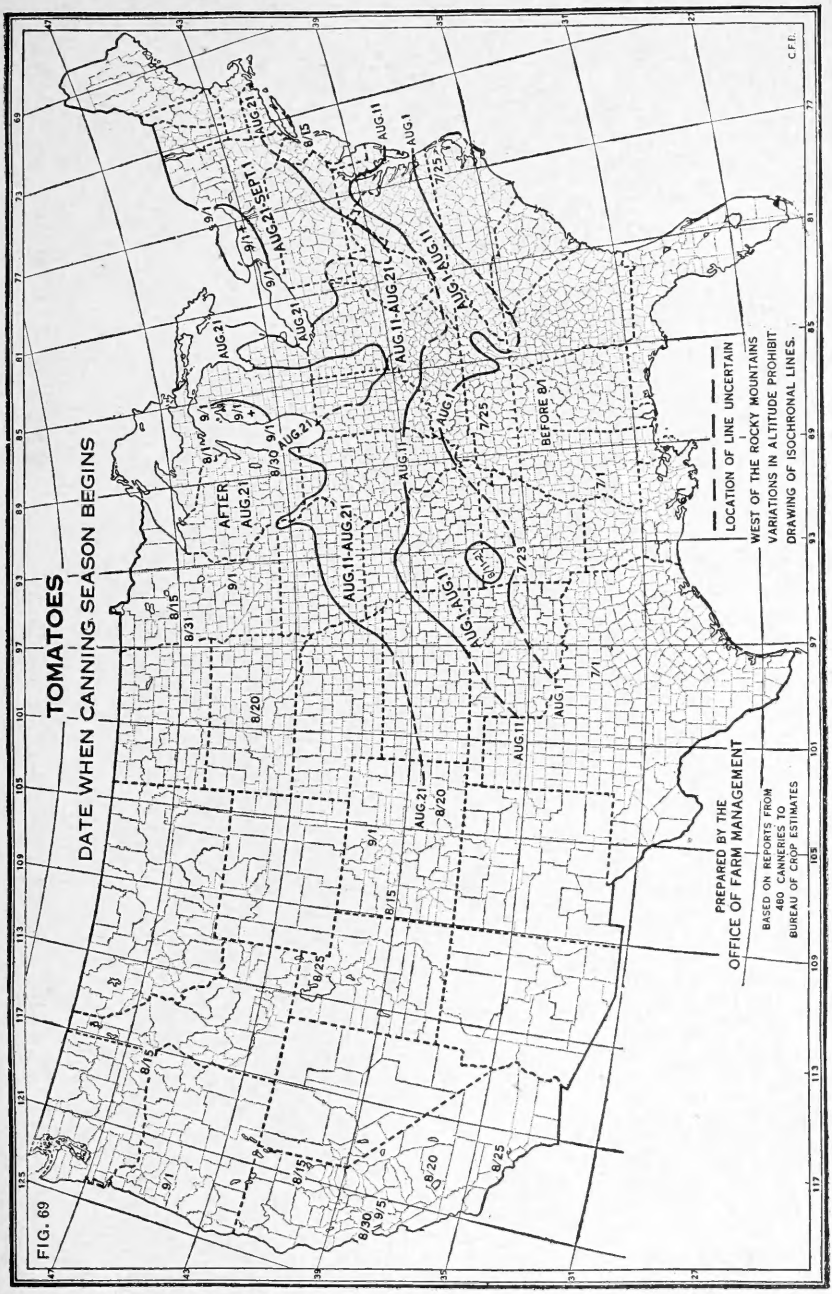

FIG. 69.—Tomato-canning factories are confined practically to the central portion of the United States. The canning season begins about August 1 in southern Virginia, Tennessee, and northwestern Arkansas, and about a month later in the lake plains of New York, in western Michigan and Iowa. The canning season generally lasts from 6 to 10 weeks. Large quantities of tomatoes are grown in southern Florida and Texas and shipped fresh to the northern markets from December to June. Large quantities are also grown for consumption in the fresh state throughout the Northern States. The picking of tomatoes for domestic use or for shipment usually begins two to four weeks earlier than the beginning of the canning season. In Maryland and other Atlantic coast districts women and children from nearby cities are employed in picking tomatoes. The map is based upon data collected from 477 canning factories by F. J. Blair, of the Bureau of Crop Estimates.

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